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Transactions of the Dental Society of the State of New ...

Dental Society of the State of New York

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DENTAL DEPARTMENT

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15-49

TRANSACTIONS

OF THE

DENTAL SOCIETY

OF THE

STATE OF NEW YORK

FORTY-FIFTH ANNUAL MEETING

HELD AT

ALBANY, N. Y., MAY 1913

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TRANSACTIONS

OF THE

DENTAL SOCIETY

OF THE

STATE OF NEW YORK

FORTY-FIFTH ANNUAL MEETING

HELD AT

ALBANY, N. Y., MAY 1913

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UNIV OF CALIF
MEDICAL SCHOOL

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TRANSACTIONS

OF THE

Dental Society of the State of New York.

FORTY-FIFTH ANNUAL MEETING.

FIRST DAY—Morning Session.

THE forty-fifth annual meeting of the Dental Society of the State of New York was opened on Thursday morning, May 8, 1913, in the assembly room of the Educational Building, Albany, N. Y. The president, Dr. C. F. Baylis, Oneonta, called the meeting to order at 10.30 o'clock.

The Rev. J. V. MOLDENHAWER, Second Presbyterian Church, Albany, invoked divine blessings on the deliberations of the society.

The vice-president, Dr. W. W. Smith, Rochester, took the chair while the president, Dr. C. F. BAYLIS, read his annual address. [See pages 61 to 63.]

Dr. SMITH appointed the following as the Committee on the President's Address: Dr. Louis Meisburger, Dr. A. R. Cooke, and Dr. W. B. Dunning; after which the president, Dr. Baylis, resumed the chair.

The next order of business was the report of the Business Committee, by Dr. H. J. BURKHART, chairman, who reported the program for the day.

Dr. G. B. BEACH, secretary of the Executive Council, presented the amendments to the By-laws brought over from the last annual meeting, and, on behalf of the Council, recommended their adoption.

Dr. Beach moved the adoption of the amendments as read. [Motion carried.]

Motion was then made and carried to adjourn until the afternoon session.

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FIRST DAY—Afternoon Session.

The meeting was called to order Thursday afternoon, at 2.30 P.M., by the president, Dr. Baylis.

The first order of business was the reading of the minutes of the previous meeting—which was dispensed with until a later session.

The next item on the program for the afternoon session was the reading of a paper by Dr. ELLISON HILLYER, Brooklyn, N. Y., entitled "The Development of the Anatomical Articulator." [See pages 64 to 86.]

REPORT OF FELLOWSHIP COMMITTEE.

The next order of business was the report of the Fellowship Committee, through the chairman, Dr. R. H. HOFHEINZ, as follows:

Mr. President and Members of the Dental Society of the State of New York,—The Committee on the Fellowship Medal, at a meeting held in Albany last year, unanimously decided to recommend that Dr. James Truman of Philadelphia become a Fellow of the Dental Society of the State of New York.

R. H. HOFHEINZ, *Chairman,*
A. L. SWIFT,
W. J. TURNER,
A. R. COOKE,
L. MEISBURGER,
Committee.

PRESENTATION OF FELLOWSHIP MEDAL.

Dr. Baylis, the president, asked Dr. Hofheinz and Dr. Cooke to escort Dr. Jas. Truman to the rostrum. He then presented the medal to Dr. Truman, with the following words:

Members of the Dental Society of the State of New York,—With each passing year the members of this society appreciate more and more the value of the fund placed at its disposal through the generosity of the donor, Dr. Wm. Jarvie, by which the society is enabled to prepare and have suitably inscribed a medal to be presented to some distinguished practitioner of dentistry who by his ability, labor, and self-sacrifice has attained eminence in the profession. The special committee whose duty it has been to select the person to whom the William Jarvie Medal should be awarded this year has made a most happy selection, not only because of the eminence and distinction of the gentleman who will be the recipient, but more especially on account of the very high personal regard in which he is held by all who have been honored with his acquaintance. It is not only a pleasure but also a great honor for me to announce that the William Jarvie Medal will this year be awarded to Dr. James Truman.

For many years as an instructor he has had much to do with shaping the minds and lives of students who have been fortunate enough to come in contact with him. As a writer he has been devoted to the elevation of the literature of the profession. His many valuable contributions to the science of dentistry are well known and appreciated by the profession. Throughout

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a long and active life he has been a leader in every activity in which he has been engaged, bringing to every subject an energy and enthusiasm which inspire everyone brought in contact with him with the desire to strive for better things and to labor for the uplift of the profession. It may be fitting to enumerate the positions of trust he has held.

James Truman, D.D.S., LL.D., was born in Abington, Pennsylvania, a suburb of Philadelphia, November 22, 1826. He was educated in the public and private schools of Philadelphia. He received his degree in dentistry at the Philadelphia College of Dental Surgery; received the honorary degree of LL.D. at the University of Pennsylvania in 1904. He was demonstrator and professor of operative dentistry in the Pennsylvania College of Dental Surgery from 1864 to 1876; was professor of dental pathology, therapeutics, and materia medica in the University of Pennsylvania in 1882; dean of the University of Pennsylvania from 1883 to 1895, and professor emeritus since 1909. Was editor of the *Dental Times*, 1865-69; editor of the *International Dental Journal*, 1890–1905, and has been a contributor to various dental publications. He is a member of the American Dental Association, honorary member of the Dental Society of Europe, member of the Pennsylvania Dental Association, the Academy of Stomatology of Philadelphia, and of the Biological section of the Academy of Sciences. He has been in active dental practice for sixty-one years in Philadelphia, with the exception of four years in Waterloo, N. Y., and four years in Germany, at Frankfort, Hanover, and Dresden.

This, briefly, is a partial history of the activities of a most remarkable man. It is a rare privilege to honor one who has been so eminent in his profession, and also has been so faithful in maintaining high standards and ideals. May he live many years to enjoy and receive the honors due him from a profession that he has done much to create, and in the interest of which he has devoted many years of ceaseless toil.

As president of the Dental Society of the State of New York, I take great pleasure in presenting to you, Dr. Truman, this medal, which expresses in a small way the love and esteem in which you are held by our members, and in so doing permit me to say that we feel highly honored in having an opportunity to confer this compliment upon one so modest and deserving.

DR. TRUMAN'S RESPONSE.

Mr. President and gentlemen of the New York State Dental Society,—Let me thank you for this unlooked-for appreciation of my efforts. I would hesitate, and do feel a delicacy in taking up your time, but I cannot allow this meeting to pass without a recognition of the deep feelings that stir my inner life today.

I consider myself as an adopted son of New York state. Here I practiced my profession for a period of several years. Here I married my wife. Here two of my children were born. Here I tried to reform the politics of the state, but I must confess with very poor success. Need I say I love this state? Nature has marked it for scenic beauty beyond comparison. I have wandered by the beautiful and placid waters of Lake Seneca; have gazed and acquired poetic inspiration as I have viewed the

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beautiful hillsides of Lake Skaneateles; have sailed the broad bosom of that great inland sea, Ontario; have stood enthralled amidst the roar of Niagara's mighty waters; have floated down the great river that flows by your doors and have been inspired by the picturesque mountain scenery—have watched as I approached the Highlands, and they seemed ready to embrace the mighty waters as they passed them by; have taken lessons from the Palisades, lessons of geological interest, as these towering walls gave evidence of the mighty power of the waters as the Hudson passed onward to the sea. Amid these manifestations of beauty and power, I said to myself: Our friends the Germans may properly sing of their historical Rhine with its castled and baronial-dotted mountain sides, but give to me, in preference, the American Hudson with its legendary lore, its Sleepy Hollows and Rip Van Winkles, its romance of Indian traditions, as it passes onward in silent grandeur, the most beautiful and majestic of all the mighty rivers that float upon the fair bosom of our great Republic.

I have labored with the mighty men of the past in this state—men from the North, South, East, and West—to rouse dentistry from its crude beginnings. I have seen, in day dreams and night visions, the great Royal Arch of Dentistry, beginning in the crude uprisings of a profession; have seen it magnificently arching the zenith of life and fading away in that seven-hued robe of glory and beauty into infinity; but it remains incomplete, the keystone is not in place—it lies prone and contemned. On it is inscribed this legend: MEDICINÆ DOCTOR. Not that I value degrees would I ask you, men of New York, to assist in placing this stone in position; but for that higher ideal that our profession should stand for—the scientific, the broader culture that this legend represents.

Here, receiving from your hands this beautiful gift, it represents to me, in its radio emanations, the future yet in store for us as one of the important factors in the healing of the nations. In memory I bow in reverential adoration of the men of the past. Here I stand in gratitude to you for this splendid recognition of my very imperfect work. Here I hopefully look into the future as the sands in my hourglass are running low, and patiently await the evolutions and developments of time. [Long-continued applause.]

The next order of business was the reading of a paper by Dr. R. Ottolengui, New York, entitled "Can the Illegal Practice of Dentistry be Limited by Law?" [See pages 87 to 96.]

After the reading of Dr. Ottolengui's paper, the secretary, Dr. A. P. BURKHART, read the following resolutions passed by the Allied Dental Council of Greater New York, together with a telegram:

At a regular meeting of the Allied Dental Council of Greater New York (being the federation of the Eastern Dental Society, the Harlem Dental Society, and the Kings County Dental Society), which was attended by nearly 500 dentists, among whom were some of the most prominent men in the country, the following resolution was unanimously adopted:

***Whereas*, quackery in dentistry has assumed proportions hitherto undreamed-of; and**

***Whereas*, this quackery is foisted upon an unsuspecting public, jeopardizing their health and well-being; and**

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Whereas, we hold it is the duty of the dental profession to protect both the good name of our profession and the welfare of society in our branch of the healing art; and

Whereas, in the lecture delivered by Dr. Ottolengui before this gathering he has outlined legislation which if carried into effect promises to stamp out this evil, which casts such a slur upon the good name of our profession; therefore be it

RESOLVED, That this gathering most heartily indorses the policy outlined by Dr. Ottolengui, and urges that the State Dental Society, being the official representative of the dental profession in the state, start its machinery in motion to the end that these suggestions be placed on the statute-books and thus become the law of the state.

ALLIED DENTAL COUNCIL, G. N. Y.
S. H. FILLER, *Sec'y*.

Dr. Ottolengui's paper was then discussed by the following gentlemen: Drs. A. S. Johnson, Brooklyn; W. H. Rogers, Brooklyn; Wm. Carr, New York; F. W. Proseus, Rochester; T. P. Hyatt, Brooklyn; L. Meisburger, Buffalo; M. L. Rhein, New York; H. E. S. Chayes, New York; with closing remarks by Dr. Ottolengui.

Motion was then made and carried to adjourn until the evening session.

FIRST DAY—Evening Session.

The Thursday evening session was called to order at 8.30 o'clock by the vice-president, Dr. W. W. Smith.

Dr. H. J. BURKHART, chairman of the Business Committee, reported the program for Friday.

The first item on the program for the evening session was the reading of a paper by Dr. T. B. HARTZELL, Minneapolis, Minn., entitled "The Operative and Post-operative Treatment of Pyorrhea." [See pages 97 to 115.]

The Secretary then read the minutes of the previous sessions, which were approved as read.

Motion was then made and carried to adjourn until the Friday morning session.

SECOND DAY—Afternoon Session.

The meeting was called to order Friday afternoon, at 2.30 o'clock, by the president, Dr. Baylis.

The first order of business for the afternoon session was the report of the Committee on Practice, by the chairman, Dr. W. D. TRACY, New York. [See pages 116 to 125.]

The next order of business was the Report of the Correspondent, Dr. E. B. PRENTISS, New York, entitled "Oral Radiography in its Relation to the Gen-

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eral Dental Practitioner." [See pages 126 to 140.]

The next order of business was the report of the Committee on Scientific Research. [See page 141.]

Professor GIES then delivered the address entitled "A further study of Sulfocyanate in Its Possible Relation to Dental Caries." [See pages 142 to 176.]

The PRESIDENT. I have much pleasure in announcing that Dr. Gies has been elected an honorary member of the Dental Society of the State of New York.

Dr. GIES. Elections to honorary membership always imply a most friendly and amiable relationship. I do not deserve any honor at your hands. The work we have done has been a very modest one—merely the beginning in a field in which we have very much to learn. I fully appreciate the pleasant mutual relationship that this action of yours suggests for the future. It will give me all the more satisfaction to cooperate in any possible way that I can toward the successful attainment of the worthy objects for which you are banded together. I consider dentistry an honorable part of medicine, just as important a part as any other that receives special attention in medicine. Your functions are primarily those of preventing and curing disease, and I hope the time will soon come when the dentist will be a medical man not only in fact but also in every sense of the word.

I am thoroughly appreciative of the honor you have conferred upon me, and I hope I can show that appreciation, in the near future, in deeds instead of in words. I thank you for your kindness. [Applause.]

Adjourned until the Friday evening session.

SECOND DAY—Evening Session.

The meeting was called to order on Friday evening, at 8.30 o'clock, by the president, Dr. Baylis.

The first order of business for the evening session was the reading of a paper by Dr. G. V. I. BROWN, Milwaukee, Wis., entitled "The Pathologic and Therapeutic Possibilities of Upper Maxillary Contraction and Expansion as Evidenced by Experiments upon Guinea-pigs, Rabbits, and Dogs, in Confirmation of Clinical Observations in Human Cases." [See pages 177 to 203.]

The next order of business was the report of the Executive Council by Dr. BEACH, the secretary. [See pages 9 and 10.]

Dr. A. P. BURKHART moved the adoption of the report of the Council as read. [Motion carried.]

The next order of business was the installation of officers, as follows:

President—Dr. W. W. Smith, Rochester.
Vice-president—Dr. A. M. Wright, Troy.
Secretary—Dr. A. P. Burkhart, Auburn.
Treasurer—Dr. G. H. Butler, Syracuse.
Correspondent—Dr. E. B. Prentiss, New York.

Motion was then made and carried that the society adjourn until the second Thursday in May 1914.

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MEETING OF EXECUTIVE COUNCIL.

Dr. Wm. Carr presented the report of the Law Committee, which was referred to the By-laws Committee. [See pages 13 to 21.]

The Secretary's Report was presented and received. [See page 11.]

The secretary is authorized to procure twenty-five additional copies of the annual report.

A communication was received from the Allied Dental Council and was ordered read after Dr. Ottolengui's paper is presented, and the secretary is instructed to answer the communication.

A motion was carried that the Report of the Committee on Legislation be accepted as read.

A motion was carried that the Legislative Committee be empowered to employ a local attorney to aid them in their work when necessary.

A motion was carried that Dr. Jewell's dues be remitted, making him clear on the books.

It was carried that Dr. I. C. Curtis, Dr. Harry E. Douglas, Dr. N. E. Foote, and Dr. Burchill of Cortland be dropped from the roll, and that the treasurer advise the treasurers of the districts in which they have been members.

A motion was carried that the State Treasurer shall correspond with the district treasurers, stating the names and amounts of those in arrears to the State Society.

A motion was carried that the chairman of the Executive Council appoint a committee of three to examine into the conditions of dental service in the state institutions. Dr. Twiggar, Dr. West, and Dr. S. Palmer were named as the committee.

A motion was carried that the colleges shall be refunded any amounts paid for delegate members this year.

A motion was carried that Dr. Butler confer with the secretary, who has a list of the different district members, and see whether they have been paid for by the district societies this year, and that the full amounts shall be returned to those who have overpaid.

A motion was carried that the treasurer be authorized to refund the dues that Dr. M. B. Eschelman has overpaid the society.

A motion was carried that we request Dr. Hyatt to present a resolution on the subject of the International Congress of School Hygiene.

A resolution from the Second district in regard to funds of the Law Committee was received.

A motion was carried that the communication of the National Mouth Hygiene Association be received and filed.

It was carried that the secretary's publishing arrangements with The S. S. White Co. regarding the proceedings of the session of 1913, be ratified.

A motion was carried that the matter of the Publicity Council be tabled.

A motion was carried that the secretary of this society extend to Dr. Wm. Jarvie of Bass Rock, Mass., our sympathy and condolence in his recent bereavement.

The sum of $200 shall be paid this year to the secretary of the society as an honorarium, and $75 shall be paid to the treasurer.

A motion was carried that one member be added to the present committee to go over the accounts of the Eastern Dental Society, and that, if the expenditures are found to be as presented in their records, we reimburse them to 50 per cent. of the fines collected from the prosecutions instituted by them, which they claim amount to $850; and that the added member of this committee shall be Dr. A. W. Twiggar of Ossining.

A motion was carried that the matter presented by Dr. Rose relating to legislation be taken up for consideration by the Council.

A motion was carried that Dr. O. W. Norton's resignation be accepted.

A motion was carried that Dr. H. C. McBrair's suggestion be accepted by this Council and referred for later consideration.

A motion was carried that the Program Committee's report be received.

A motion was carried that the secretary be instructed to strike from the minutes of

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the meeting in the published proceedings all personal discussions that he may deem undesirable.

The district societies have all voted for the reorganization of the State Society, and this reorganization has been completed by the adoption of the By-laws presented by the Executive Council.

The Committee on Necrology reported no deaths this year among our members.

Motion was carried that the treasurer be authorized to pay any bills presented by the members of the Executive Council for expenses incurred at the special meeting in Rochester in November 1912.

The Fellowship Committee reported the selection of Dr. James Truman to receive the Jarvie gold medal.

A motion was carried that a committee of five be appointed by the chairman of this Council to consider the suggestion set forth in the paper of Dr. Ottolengui, and to consider the present law of the state of New York and of such laws as they may deem it necessary to investigate of other states, and to report their conclusions to this Council on or before the next annual meeting. The committee appointed was—Dr. A. R. Cooke, Dr. R. Ottolengui, Dr. H. J. Burkhart, Dr. Wm. Carr, and Dr. Ellison Hillyer.

A motion was carried that the report of the Committee on Trained Dental Nurses be received and placed on file, and that the committee be continued.

The report of the Committee on Scientific Research was referred to the By-laws Committee, and its recommendation for an appropriation of $500 for its work for the ensuing year was ordered.

The report of the Committee on the President's Address was received and accepted, and the recommendations adopted.

A motion was carried that the resolution of Dr. Ottolengui, asking for the pardon of Dr. W. J. Morton of New York City, who is now confined in the Federal prison at Atlanta, be adopted.

A motion was carried that the Law Committee's report be accepted and a summary printed.

A motion was carried that the resolution presented by Dr. Hyatt for the appointment of a committee of five to be represented on the Committee of One Hundred be adopted.

No report was received from the Oral Hygiene Committee.

The By-laws Committee reported, and the report was accepted.

A motion was carried that the report of the Clinic Committee be received, and that the chairman of the committee be empowered to have the necessary repairs made to the chairs used for clinical purposes.

A motion was carried that 2000 copies of the By-laws be printed, with a list of the registered dentists of the state incorporated in them.

All bills presented to the New York State Dental Society shall be itemized before payment shall be authorized by the By-laws Committee or paid by the treasurer.

The Committee of Arrangements' report was received and accepted.

Dr. Wm. J. Gies was made an honorary member of the New York State Dental Society.

The recommendations of the district societies for the election of their committees for the ensuing year were adopted. [See District Societies' Reports, pages 25 to 43; also Officers and Committees for 1913–14.]

The officers of the society were elected, as follows:

President—W. W. Smith, Rochester.
Vice-president—A. M. Wright, Troy.
Secretary—A. P. Burkhart, Auburn.
Treasurer—G. H. Butler, Syracuse.
Correspondent—E. B. Prentiss, New York.

The election of eight delegates to the National Dental Association resulted as follows:

E. G. Link, Rochester. *Alternate*, A. P. Burkhart, Auburn.

J. W. Canaday, Sr., Albany. *Alternate*, C. K. Van Vleck, Troy.

Louis Meisburger, Buffalo. *Alternate*, C. S. Butler, Buffalo.

R. Ottolengui, New York. *Alternate*, H. C. Ferris, Brooklyn.

A. C. Rich, Saratoga Springs. *Alternate*, W. S. Rose, Schenectady.

Chas. Baylis, Oneonta. *Alternate*, J. B. West, Elmira.

A. W. Twiggar, Ossining. *Alternate*, S. Palmer, Poughkeepsie.

H. L. Wheeler, New York. *Alternate*, W. C. Deane, New York.

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REPORTS OF OFFICERS AND COMMITTEES.

Report of the Secretary.

TO THE DENTAL SOCIETY OF THE STATE OF NEW YORK:

Gentlemen,—The usual routine work during the year has been performed. The secretaries of the district societies have forwarded their annual reports, methodically arranged on blanks furnished each secretary by the State Secretary.

Shortly after the close of the session of May 1912, Dr. G. H. Butler, the State Treasurer, transmitted to me a renewal of a $5000 surety bond issued by the American Surety Co. of New York.

The usual preliminary notice was sent to all members about March 20th. This notice gave full information in relation to hotels, railroad transportation, and general synopsis of the present meeting.

At a called meeting of the Executive Council, held at the Hotel Seneca in the city of Rochester during the fall of 1912, the revision of the by-laws was taken up. After a careful revision of the By-laws the secretary was directed to have typewritten copies of the proposed By-laws made. This work was performed and a copy sent to each member of the Executive Council for use at the present meeting. The revision of the By-laws to conform to the changes essential for affiliation with the National society has called for an extensive correspondence with the various district societies.

The S. S. White Co., during the month of February 1913, issued the printed proceedings of the session of 1912, and by mail distributed the same to all district members. The number published just covered the actual membership, leaving but two copies in the hands of your secretary. In view of the constant demand on the part of sister state societies, libraries, and individuals, I respectfully recommend that the S. S. White Co. prepare and furnish your secretary an additional thirty copies over and above the number required for membership distribution. The thirty copies I recommend be purchased from the publishing company at a fair price. I also recommend the renewal of a contract with the S. S. White Co. for the meeting of 1914, on the same basis as entered into for the meeting of 1913.

There are a number of communications which will be read for your information and action, and I will read them in the order arranged. I do not deem the communications of sufficient importance to make them a part of the printed proceedings.

The expenses for the year are as follows:

Auburn Publishing Co., Auburn, N. Y.	$58.35
Postage for sending preliminary notices, programs, letters to clinicians, and addressing	48.84
General postage, expressage, telephone messages, wrapping-paper, twine, etc.	18.19
	$125.38

Respectfully submitted,

A. P. BURKHART, *Sec'y.*

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Report of the Treasurer.

SYRACUSE, May 8, 1913.

TO THE DENTAL SOCIETY OF THE STATE OF NEW YORK:

"A." SOCIETY FUND.

Receipts.

Balance from 1912	$1045.06
Membership fees and annual dues	675.00
Dental colleges	12.00
For exchange on checks	.80
Exhibit Committee	343.66
Interest on deposits	55.97
Total receipts	$2132.49

Disbursements.

Bills of committee members	$65.65
Secretary's bill of expense	67.62
" honorarium	150.00
Treasurer's expenses	8.65
" bond	17.50
" honorarium	75.00
Auburn Publishing Co.	37.60
Pulis Printing Co.	46.50
Exchange on checks	2.97
Committee of Scientific Research	300.00
S. S. W. Dental Mfg. Co.	114.06
Badges	30.85
Cash balance	1216.09
	$2132.49

"B." LAW FUND.

Receipts.

From First District Society	$1500.00
" Second " "	875.00
" Fifth " "	150.00
" Eighth " "	50.00
	$2575.00

Disbursements.

Expenses of First District Society	$1352.55
" " Second " "	931.45
" " Fifth " "	132.69
" " Eighth " "	130.30
Cash balance	28.01
	$2575.00

"C." JARVIE MEDAL FUND.

Credits.

Balance from 1912	$5.00
From Erie bond	40.00
" N. Y. City bond	10.00
1 Erie gold bond	1000.00
1 N. Y. City bond	250.00
	$1305.00

Debits.

Bonds	$1250.00
Cash	55.00
	$1305.00

RECAPITULATION.

Credits.

Total balance, 1912	$1050.06
Society Fund (A)	1087.43
Law Fund (B)	2575.00
Jarvie Fund (C)	50.00
	$4762.49

Debits.

Society expenses, 1912–13	$916.40
Legal expenses	2546.99
Cash balance, May 8, 1913	1299.10
	$4762.49

Respectfully submitted,

G. H. BUTLER, *Treasurer.*

Examined and found correct:

C. A. BRADSHAW,
A. V. NEEDHAM,
W. A. WHITE,
Auditors.

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Report of the Law Committee.

TO THE DENTAL SOCIETY OF THE STATE OF NEW YORK:

Mr. President and Gentlemen,—The Law Committee of the Dental Society of the State of New York beg to submit herewith their report for the year 1912–13.

Your committee organized immediately after their election by appointing Dr. Wm. Carr chairman, and retaining Wm. A. Purrington, Esq., as counsel for the society.

The annexed tables show, as usual, the status of cases.

TABLE "A."

(*a*) Cases in which warrants have been issued wherein it has not been possible to bring the accused to trial.

NAME.	COUNTY.	DATE OF WARRANT.	REMARKS.
Hunter, C. F.	New York	Nov. 25, 1902...	Fugitive.
Cook, William R.	"	" 8, 1893...	"
Adams, C. O.	"	" 12, 1897...	"
Mitchell, Ormsby	"	Feb. 21, 1898...	"
King, Archibald	Kings	Apr. 25, 1899...	"
Randell, Maurice (1)	New York	May 4, 1900...	
Seeley, Richard	"	Dec. 6, 1901...	"
Levy, Mark	Kings	" 6, 1902...	"
Packard, Frank D.	"	Jan. 26, 1904...	"
Meade, Richard	New York	Apr. 7, " ...	"
Hackett, Alice (2)	"	May 10, " ...	
Maloney, John	"	Sept. 8, " ...	"
Dolan, John	"	Nov. 27, 1905...	"
Haganour, Henry	Oneida	Sept. 24, 1907...	"
Rubenstein, Louis	Kings	July 10, " ...	"
Marbo, Louis	"	June 26, 1908...	"
Yueck Woo Wun	New York	Feb. 15, 1909...	Warrant Unexecuted.
Diener, A. J. (3)	"	June 25, " ...	Fugitive.
Gallico, E. J.	Rensselaer	Aug. 27, " ...	Withdrawn.
Bryans, Walter	"	" 27, " ...	"
Suhrland, Atle B.	"	" 27, " ...	"
Hocking, T. H.	Kings	Oct. 2, 1911...	Fugitive.
Feinstein, Jos. (4)	New York	July 8, " ...	"
Zacharopoulos, D. (5)	"	Nov. 14, 1912...	"

(1) This man is reported to be dead.

(2) This woman's case has always been adjourned by the court on representations that she was too ill to be brought to trial.

(3) A later warrant was issued on May 24, 1910, on which he was arrested, and on June 23, 1910, he was fined $50.

(4) This man had been convicted for a first offense on May 17, 1911, and fined $150.

(5) This man had been previously convicted in 1911 and fined $50.

Note.—"Fugitive" means one upon whom the police have failed to serve the warrant, presumably because the accused has fled the jurisdiction. Probably none of the defendants could be convicted now upon the evidence even if brought to trial. The names are carried from year to year for the sake of record. One of them occasionally comes above the surface, as did A. J. Diener, He was arrested on a new warrant, called to trial and convicted.

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TABLE "A."—*Continued.*

(*b*) Cases pending on May 1, 1912, in which warrants were issued after May 1, 1911, and their disposition, if any.

NAME.	COUNTY.	DATE OF ARREST.	REMARKS.
Thomas, Dirk	Kings	Oct. 3, 1911...	Withdrawn on his passing his examinations and becoming licensed.
Firth, Alfred G.	"	Nov. 22, " ...	Demurrer to information sustained; appeal pending.
Teetsell, John	New York	Dec. 7, " ...	Discharged on his own recognizance.
Wright, Maurice	Kings	Jan. 9, 1912...	Fined $500.
Grossman, Jacob	New York	Apr. 15, " ...	" $100.
Tronson, Chas. W. (1)	Ulster	" 9, 1909...	Dismissed.
Griswold, Hector (2)	New York	" 20, " ...	Conviction and fine of $50 affirmed on appeal June 7, 1912.

(1) This case is included here, although the warrant was issued prior to May 1, 1911, in Kingston, Ulster County, because, as I learn upon inquiry, it was dismissed by the District Attorney on June 14, 1910, because of his inability to procure the testimony of Belle Conro, former agent of the Society, a conclusion of the case of which I was not advised at the time. Upon that day he notified me that he could not go on with the case for lack of that testimony.

(2) Although the warrant in this case was also issued prior to May 1, 1911, the appeal was not decided until June, 1912. The case was therefore placed among those pending in the last report.

The amount of fines sent to the treasurer from prosecutions conducted exclusively by Mr. Purrington's office is $2000, of which $100 was due and uncollected at the date of the last report. Other fines sent in from prosecutions conducted by Messrs. Sparks & Fuller, retained by Dr. Johnson in the Second district, amount to $375, of which $200 were outstanding last year. Thus the treasurer has received from the First and Second districts, in all, $2375, an amount much smaller than that sent you last year, which was $4500. The difference is due largely to the fact that the number of cases pending at the close of the year 1910–11 and completed in 1911–12, viz, 28, in which $1500 of fines were imposed, was much greater than at the close of the year 1911–12, when only five cases were pending, in which $600 of fines were imposed. There were also three convictions in Syracuse, in each of which a fine of $50 was imposed, in all $150, and a fine in the Eighth district of $50. These fines were sent directly to the treasurer and did not pass through the hands of your chairman.

Thus it appears that the total amount of fines sent to the treasurer during the last year was $2575. The total amount of fines imposed in 25 cases initiated in the First district during the last year was $1775, as against $2325 imposed in the same number of cases in the preceding year, a difference of $550. On the other hand, the heaviest punishment ever inflicted in the society's prosecutions was imposed during the last year upon one Kukay, who after conviction of illegal practice had continued to violate the law and also to conduct the so-called school from which he issued diplomas. He was sentenced to pay a fine of $500 and also served three months in prison. Another defendant, Demirjian, was sentenced to sixty days in prison without alternative of fine. Three others served time instead of paying their fines, which if paid would have increased the amount received from this source by $375.

The total amount of fines imposed in prosecutions conducted entirely by Mr. Purrington's office in the First district during the year 1912–13 was $1775, to which must be added $500, in the fine of Wright, whom he prosecuted in the Second district, in all $2275. The amount of fines imposed in prosecutions of ten cases by Messrs. Sparks & Fuller in

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TABLE "B."

Cases initiated since May 1, 1912.

NAME.	COUNTY.	DATE OF ARREST.	RESULT.
Sapolsky, Lazarus	New York	June 11, 1912	Acquitted.
*Canery, Leo	"	July 13, "	Fined $75.
Feinstein, Jos.	"	.....	Warrant unexecuted—fugitive.
Kukay, J. M. G.	"	May 22, "	Fined $500 and 3 months in jail.
Demirjian, Dick	"	Aug. 19, "	Sentenced to 60 days in jail.
Hirschfeld, Eva	"	" 27, "	Fined $50.
*Harland, Harold	"	Sept. 3, "	" $250.
Glazier, Samuel	"	" 2, "	Sentence suspended.
*Perkins, John	"	" 6, "	Fined $50.
Bravo, Louis	"	" 9, "	" $50.
Hickey, Mary E.	"	" 11, "	" $100 for practicing without license.
Hickey, Mary E.	"	" 11, "	Sentence suspended for non-posting.
Hogobian, John	"	" 21, "	Fined $250 for practicing without license.
Hogobian, John	"	" 21, "	Sentence suspended for non-posting.
Cunningham, P. T.	"	Oct. 10, "	Acquitted.
Vogel, Edward B.	"	Jan. 25, 1913	Fined $250.
Ampel, Herman	"	" 27, "	" $100.
Wernet, Frank	"	Mar. 13, "	Sentence suspended.
Irving, Alex. A.	"	" 15, "	Awaiting trial.
Israelson, Gustave A.	"	" 29, "	Withdrawn.
Holbrook, Henry P.	"	" 29, "	"
Schaefer, Wm. M.	"	Apr. 14, "	Awaiting trial.
Brown, Chas. H.	"	" 12, "	" "
Harlem Dental Co.	"	" 23, "	" "
Zacharopoulos, Deny	"	.....	Warrant unexecuted—fugitive.

* These men did not pay their fines, but served full time.

the Second district is, as reported by them on April 25th, $825. Adding to these sums the fines imposed in Syracuse, $150, brings the total of fines imposed, $3250.

All fines imposed in the prosecutions by Mr. Purrington's office have been collected and sent to the treasurer. Of the fines imposed in prosecutions conducted by Messrs. Sparks & Fuller in the Second district, there are outstanding and collectable $650, of which I was not advised until April 25th. They have been applied for.

In the prosecutions in the First district, sentence was suspended upon three persons, Samuel Glazier, who pleaded guilty and gave information against his employer Cunningham, and Mary Hickey and John Hogobian. The last two were convicted of illegal practice and fined, the suspensions of sentence were upon the charge of not posting their names. In the First district there were two acquittals—Lazarus Sapolsky, complained of by an actual patient who refused to identify him on trial, and P. T. Cunningham, whose case was unusual. Cunningham, a licentiate, employed Glazier, whose sentence was suspended as above stated, to carry on a branch office. Glazier testified that Cunningham employed him for seven months with full knowledge that he was not licensed. Then a personal difference arose between the two men. Cunningham reported the employee as practicing illegally and upon the latter's complaint was charged with aiding and abetting in the misdemeanor. He defended upon the ground that Glazier told him that he was

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TABLE "C."

Result of Cases tried between May 1, 1912, and May 1, 1913.

NAME.	COUNTY.	FINE.	REMARKS.
Thomas, Dirk	Kings	.....	Withdrawn on his becoming licensed.
Wright, Maurice	"	$500	
Griswold, Hector	New York	.....	Conviction affirmed by Appellate Division.
Grossman, Jacob	"	100	
Kukay, J. M. G.	"	500	And also 3 months in jail.
Harland, Harold	"	250	Did not pay his fine but served full time.
Perkins, John	"	50	Did not pay his fine but served full time.
Bravo, Louis	"	50	
Hickey, Mary E.	"	100	On the non-license charge.
Hickey, Mary E.	"	.....	Sentence suspended on the non-posting charge.
Hogobian, John	"	250	On the non-license charge.
Hogobian, John	"	.....	Sentence suspended on the non-posting charge.
Canery, Leo	"	75	Did not pay his fine but served full time.
Sapolsky, Lazarus	"	.....	Acquitted.
Demirjian, Dick	"	.....	Sentenced to serve 60 days in jail.
Cunningham, Peter T.	"	.....	Acquitted.
Glazier, Samuel N.	"	.....	Sentence suspended on the society's recommendation.
Hirschfeld, Eva	"	50	
Vogel, Edward B.	"	250	
Ampel, Herman	"	100	
Wernet, Frank	"	.....	Sentence suspended. He was charged with non-posting but was licensed and registered.
Israelson, Gustave A.	"	.....	Withdrawn as he got out of business.
Holbrook, Henry P.	"	.....	Withdrawn as he got out of business.

registered. On this point there was an issue of veracity. Cunningham apparently received the benefit of the doubt and was acquitted, one justice dissenting. In the opinion of counsel, the acquittal was contrary to the tenor of decisions both of the court of Special Sessions, where he was tried, and in the court of Appeals, since, in this class of cases, criminal intent is not an element of the offense.

Three complaints have been withdrawn—those against Dirk Thomas in the Second district, and Gustave A. Israelson and Henry P. Holbrook in the First district.

Two persons against whom warrants were issued in the First district, Feinstein and Zacharopoulos, both of them formerly convicted, have evaded arrest and are reported to have left the state—a satisfactory result.

The appeal of Hector Griswold upon the ground that the law was unconstitutional, which was pending at the date of the last report, was finally brought to argument. Briefs were submitted by the district attorney and Mr. Purrington, and the judgment of conviction was affirmed by the appellate division of the Supreme Court, First District. Thus the society has prevailed in the only appeal taken from convictions upon its prosecutions.

At the date of the last report, it was said that the district attorney in the Second district would appeal from the judgment sustaining the demurrer by one Firth, who had been held to answer by the committing magistrate in a prosecution initiated by Mr. Purrington. The new district attorney drew the information differently from the form always

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TABLE "D."

Table of Fines sent to the Society during the Year 1912–13.

(*a*) Cases tried through the office of W. A. Purrington, Esq.:

Mackey, William J. (Apr. 2, 1912) ...	$100
Wright, Maurice (May 15, 1912) ...	500
Grossman, Jacob (June 27, 1912)	100
Bravo, Louis (Sept. 17, 1912)	50
Hogobian, J. (Oct. 15, 1912)	250
*Kukay, J. M. G. (July 19, 1912)	500
Hickey, Mary E. (Sept. 27, 1912)	100
Hirschfeld, Eva (Dec. 12, 1912)	50
Vogel, Edward B. (Feb. 13, 1913)	250
Ampel, Herman (Mar. 13, 1913)	100
	$2000

* This man also served three months in jail.

(*b*) Cases tried through the office of Messrs. Sparks & Fuller:

Mogull, Alexander (Apr. 10, 1912) ...	$50
Hussar, Ernest (Apr. 24, 1912)	100
Asfar, Joseph (Mar. 18, 1912)	50
D'Leen, Lewis (May 28, 1912)	75
Erol, Millard (February 14, 1913)	50
Standemair, Robert (Feb. 14, 1913)..	50
	$375

TABLE "E."

Fines imposed and outstanding.

(*a*) Cases tried by office of W. A. Purrington, Esq.:

All fines imposed have been collected.

(*b*) Cases tried by office of Messrs. Sparks & Fuller:

Dowd, James (May 28, 1912)	$50
Hartley, W. S. (Oct. 3, 1912)	150
Bischoff, F. W. (Oct. 15, 1912)	50
Crago, J. M. (Dec. 2, 1912)	150
Foster, John (Dec. 5, 1912)	50
Silver, H. (Jan. 2, 1913)	100
Bellakowsky, John (Jan. 31, 1913) ...	100
	$650

TABLE "F."

Cases pending May 1, 1913

(*a*) Pending cases previously brought forward from past years, most of which are practically dead cases. (See Table "A.")

(*b*) Pending cases in which warrants were issued during the year 1912–13.

NAME.	COUNTY.	DATE OF ARREST.	REMARKS.
Irving, Alexander A.	New York	Mar. 15, 1913...	
Schaefer, Wm. M.	"	Apr. 14, " ...	
Brown, Chas. H.	"	" 12, " ...	
Harlem Dental Co.	"	" 23, " ...	

TABLE "G."

Summary.

Convicted and fined	12
Convicted with sentence suspended	4
Acquitted	2
Withdrawn	3
Conviction affirmed on appeal	1
	22
Dead cases pending and carried for record	24
Live cases pending	4

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heretofore followed, upon which all demurers had been overruled. He preferred to test his form by appeal rather than substitute a new information. He says that this appeal will be brought on for argument within ten days.

The Regents of the University, desiring to amend the law so as to have wider scope in appointing state dental examiners to provide for examination of students in certain subjects at the close of the second collegiate year, and to increase the term of study, the moment seemed opportune to amend the law upon lines which we have suggested in previous reports. The committee appointed by this society, consisting of Drs. Meisburger, Gould, and Carr, to draft the amendment to the present law, in conference with the regents and examiners, met in New York, with Wm. A. Purrington, Esq., counsel of the State Society, who prepared and submitted a draft of the amendment to the committee, such as in his judgment and experience he deemed wise for the better enforcement of the law. This bill was submitted to and approved by the Regents' office; but after its introduction there was a conflict between the Law Committee and the Legislative Committee, the latter contending that your chairman had usurped power in introducing the bill. The chairman would state that he did not do this intentionally, but believed that the committee as appointed were empowered to draft amendments and to introduce them into the legislature. The bill amended the law in a way to clear up certain technicalities which have proved to be stumblingblocks for some magistrates and to cover better than the law now does anonymous practice in "parlors." Certain persons interested in "dental parlors" succeeded in having the bill amended on the floor of the Assembly, after it had been reported favorably from the committee, in a way that would allow corporations to practice, which the law as construed by the courts now forbids, and also the use of trade names. Your chairman immediately went to Albany and had the objectionable amendments removed from the Assembly bill and the measure restored substantially to its original form and re-committed.

After being passed by the Assembly, and when it should have been on its way to the Senate the bill was "lost," and for two hours or more Senator Seely, his clerk and stenographer, and Mr. Tudor, all searched for it, but were unable to find it; we then had a duplicate made at the last minute and rushed it over to the Senate, only to find out that in the meantime an agreement had been made between the party leaders in the Senate that the only measures that would be taken up before adjournment would be concurred-in bills, that is, bills already passed by both houses; and as we were working under unanimous consent, an objection from one Senator prevented the passage of the bill.

Report from Second District.

Dr. WM. CARR, Chairman Law Committee.

Mr. Chairman,—My term of office has not been as efficient as I had hoped—due to two things: First, to inexperience on my part; and second, we have paid as much for poor work of agents as we should have paid for good work; as much for disloyalty as for loyalty.

I. *Cases left over from last year* (four)—disposed of as follows: (1) Alfred G. Firth (fourth offense), found guilty; defendant's counsel interposed a demurer, which pigeonholed the case in the district attorney's office. This case was handled by Mr. Purrington of New York. (2) Maurice Wright, fined $500. (3) James Dowd, fined $50. (4) Louis D'Leon, fined $75. Total, $625.

II. Twenty cases, disposed of as follows:

Fined (eight)—John Bellkowsky, $100. Frederick W. Bishoff, $50. John M. Crago, $150. John Erol, $50. John Foster, $50. Wilber S. Weartley, $150. Robert S. Standenmeier, $50. Harry Silver, $100. Total, $700.

Sentence suspended (five)—Louis D'Leon (second offense). Abraham Gortz. John Glasco. Isadore Kelner. Jacob Soloman.

Dismissed (two)—Arthur Kelly. Kairo Solotin.

Withdrawn (three)—John Manning. Abraham Koffman. Nelson R. Ford.

Fugitive—Joseph Romain.

Convicted of taking graft—Maurice Safier. Sentence suspended.

Total fines for the year, $1325. Total expenses for the year, $1408.60. Of this amount Dr. Carr has sent me $851.45, leaving a balance due me of $557.15 from the State Society.

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BROOKLYN, N. Y., May 1, 1913.

To professional services rendered:

Court services	$695.00
General services	250.00
Disbursements	57.70
	$1002.70

In connection with this report I would recommend that a bill be put through the legislature making *annual registration* compulsory. This would make every registered dentist ethical or unethical; a policeman working in his own interest and that of the public to keep out the unlicensed.

A. S. JOHNSON.

Report from Third District.

Dr. WM. CARR, Chairman Law Committee.

Mr. Chairman,—As a representative of the Third District Dental Society on your committee, I herewith submit my report for year ending May 1913.

Acting on the advice of the executive committee of the Third District Dental Society, we employed Mr. Guy Swinnerton, attorney, to conduct any cases of prosecution for illegal practice in our district.

As a result of the evidence obtained there were thirteen informations filed with the police justice of the city of Troy for the following reasons and against the following persons:

Failure to display name of assistant: Sigel Roush. Edward J. Knauff.

Failure to display name: Wm. A. Joy. Geo. A. Hollister. Earl J. Leslie. Geo. Romain. Atle B. Suhrland. Arthur W. Livingston.

The informations against the preceding were sworn to by the men who obtained the evidence.

The following were charged with practicing without a license: Atle B. Suhrland. Geo. Romain. Arthur W. Livingston. Earl J. Leslie. Wm. A. Joy.

The informations charged these persons for failure to display their names were returnable January 13th. All appeared represented by attorneys, pleaded "Not guilty," and demanded a jury trial.

While no convictions were obtained, three of the persons arraigned have left the city and one decided to register, as he had a license to do so.

Respectfully submitted,

A. M. WRIGHT.

Fourth District—No Report.

Report from Fifth District.

Dr. WM. CARR, Chairman Law Committee.

Mr. Chairman,—From the Fifth district I have to report that we have secured three convictions for illegal practice with a fine of $50 in each case. Total, $150. The expenses amounted to about $133, leaving a balance of some $17 for the State Society treasury.

It is interesting to note that the justice criticized the Dental Society for allowing these men to practice so long before bringing them to trial. If he only knew how hard it was to get the evidence to convict!

Respectfully,

C. J. PETERS.

Sixth District—No Report.

Seventh District—No Report.

Report from Eighth District.

Dr. WM. CARR, Chairman Law Committee.

Mr. Chairman,—The member of the Law Committee for the Eighth District begs leave to submit the following report for the past year:

A number of cases of illegal practice have come under the notice of your committeemen this year past. Only one of these has come into court, and in that case the defendant was convicted and fined fifty dollars. This transpired last July and August, and was the first thing to arise after the State Meeting last May. The defendant was A. H. Jurk, a graduate, I believe, of some German school of dentistry.

Financial statement.

Acct. rendered December 1, 1912 .... $34.15

The assistance of Dr. Roberts, on the local committee, is again gratefully acknowledged, as is also the prompt and careful attention given by our counsel to the work during the past year.

Respectfully submitted,

FRED A. BALLACHEY.

Ninth District—No Report.

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Receipts and Disbursements.

(May 1, 1912, to May 1, 1913.)

Forwarded to Treasurer—City warrants as follows:

Date.	FIRST DISTRICT.	
June 25, 1912	$100.00	
Aug. 14, "	100.00	
Oct. 23, "	50.00	
Nov. 21, "	250.00	
Dec. 6, "	600.00	
Jan. 21, 1913	50.00	
Apr. 18, "	350.00	
		$1500.00
	SECOND DISTRICT.	
May 16, 1912	$150.00	
June 26. "	500.00	
June 28, "	50.00	
July 8, "	75.00	
Apr. 30, 1913	100.00	
		875.00
	FIFTH DISTRICT.	
Dec. 9, 1912	$150.00	150.00
	EIGHTH DISTRICT.	
Nov. 13, 1912	$50.00	50.00
		$2575.00

Note: The warrants from the Fifth and Eighth districts were not sent through Dr. Carr, but were forwarded directly to the treasurer.

Disbursements.

(May 1, 1912, to May 1, 1913.)

FIRST DISTRICT.

Received from Treasurer, and paid to Mr. Wm. A. Purrington for retainer and disbursements:

June 25, 1912	$203.35	
Oct. 5, "	398.76	
Dec. 6, "	375.82	
April 30, 1913	374.62	
		$1352.55
Balance due Mr. Purrington for retainer and disbursements for February, March and April	$556.21	

SECOND DISTRICT.

June 1, 1912, Dr. W. H. Rogers, balance due as per last report	$80.00	
June 27, 1912, Dr. A. S. Johnson	333.00	
Oct. 5, 1912, Dr. A. S. Johnson	273.45	
April 18, 1913, Dr. A. S. Johnson	245.00	
		$931.45

THIRD DISTRICT.

Balance due Dr. A. M. Wright, for moneys paid for enforcing law	$80.00	

FIFTH DISTRICT.

Dec. 11, 1912, Dr. A. R. Cooke	$83.82	
Dec. 26, 1912, Attorney's fee	25.75	
Dec. 26, 1912, Dr. C. J. Peters	23.12	
		$132.69

EIGHTH DISTRICT.

Oct. 5, 1912, Dr. F. A. Ballachey	$130.20	
Exchange on warrant	.10	
		130.30
Balance due Dr. Ballachey to May 1, 1913	$34.15	
Balance in treasury		28.01
		$2575.00

For moneys paid by Dr. Wm. Carr, chairman, First district, to Gaetano d'Amato, Miss Jacoby, Miss Brandenberg, Miss Skinner, Miss Michaels, and Miss Wenman (detectives) for county clerks' certificates, witness fees, car fares, films for photographs and developing, fees for operations, as per vouchers:

For May 1912	$158.80	
" June "	159.70	
" July "	148.85	
" August "	82.20	
" September "	247.30	
" October "	191.50	
" November "	133.68	
" December "	181.20	
" January 1913	190.10	
" February "	167.45	
" March "	221.85	
" April "	138.40	
		$2021.03
Balance due Dr. Carr as per last report		2204.39
Total amount due Dr. Carr to date		$4225.42

Summary.

The important things accomplished by the Law Committee during this year beyond the convictions for illegal practice were—First, the appeal of Hector Griswold, upon the ground that the law was unconstitutional. Briefs were submitted by Mr. Purrington and the judgment of conviction was affirmed by the appellate division of the Supreme Court.

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Thus the constitutionality of the law is upheld.

Second was the arrest and conviction of J. M. G. Kukay, who was conducting a school and issuing diplomas. The society has been trying to get evidence against him for the past two years. We finally secured evidence to convict him, and he was fined $500 and sentenced to three months' imprisonment. He has since left for another state.

The Supreme Court of this state has handed down a decision that corporations cannot either practice law, medicine, or dentistry; your attorney, taking advantage of this decision, caused the arrest of Gustave A. Israelson and Henry P. Holbrook, proprietors of the "Union Dental Parlors." Under advice of their counsel they produced affidavits that they had discontinued the "parlors." This is our first effort to break up dental parlors and corporations.

Respectfully submitted,

WILLIAM CARR, *Chairman.*

Report of Committee on President's Address.

TO THE DENTAL SOCIETY OF THE STATE OF NEW YORK:

Your committee reports its hearty appreciation of the liberal and progressive spirit which dominates the President's address. His graceful expressions of welcome to the members and guests of our society make a fitting climax to the painstaking preparation for the meeting over which he has presided.

His recommendation is heartily approved that the individual members of our society, now greatly augmented in numbers through the recent reorganization, enter upon a campaign of missionary work to induce fellow practitioners throughout the state to enter their district societies, and thence increase the membership of the State Society. The efforts of the many in this direction will have necessarily a far-reaching effect in upbuilding a powerful state organization, so much needed for the advancement of our profession and for the protection of the public welfare.

We heartily indorse his comments upon the scientific work which has been forwarded by Professor Gies and his associates. In view of the fundamental character of this work as bearing upon the public health, we suggest that the appropriation for the coming year be not less than five hundred dollars, instead of three hundred dollars, as mentioned. The prospective Committee on Scientific Research would thereby be able to widen materially its scope of activity during the coming season.

In view of his services to dental science, rendered with enthusiasm and personal disinterestedness, we feel that the election to honorary membership of Professor Gies is an honor primarily to our society. We trust that this action will be gratifying to Professor Gies as a mark of our distinguished appreciation of his work, and of our desire to reckon him among our number.

The suggestion that a committee be appointed to confer with the state authorities on the selection of Dental Books for the state library is approved.

Respectfully submitted,

LOUIS MEISBURGER, *Chairman,*
W. B. DUNNING,
A. R. COOKE,
Committee.

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Report of Committee of Arrangements.

TO THE COUNCIL:

Gentlemen,—The Committee of Arrangements would respectfully submit the following report.

This year a new departure has been made in holding the meeting, in that the literary part of the program has been held in the auditorium of the new State Education building, while the exhibits and clinics were held at the Ten Eyck hotel.

The State Society now possesses six clinic chairs, two of which are out of commission, one being broken last year while in service at our own meeting, the other being broken while in the service of the Third District Dental Society.

Your committee would recommend that the Arrangements Committee for the coming year be empowered to have these chairs placed in proper condition for usage.

Respectfully submitted,

L. S. BLATNER, *Chairman,*
GEORGE VANDERPOOL,
MORTON VAN LOAN,
Committee.

Report of Clinic Committee.

TO THE COUNCIL:

Gentlemen,—I wish to bring to the attention of the Council the condition of the chairs owned by the society, and the requirements of the Clinic Committee.

We own seven chairs, and three are out of repair, viz, broken, motheaten, and not fit to be used as they are. At the clinics today we did not have chairs enough.

The society should have property adequate and appropriate to carry out its functions. Can some action be taken to remedy this condition?

Respectfully submitted,
CHARLES E. ALLEN, *Chairman.*

Report of By-laws Committee.

TO THE COUNCIL:

Gentlemen,—The Committee on By-laws beg to report that we find the report of Dr. G. H. Butler, treasurer, correct. The report, with vouchers of Exhibit Committee for 1912 meeting, is correct and audited.

The report of Clinic Committee for 1912 is correct.

The Secretary's report is also correct and passed.

We would suggest that members of all committees, especially the Law Committee, should act and incur expense only at the suggestion of the chairman.

Respectfully submitted,
C. A. BRADSHAW, *Chairman.*

Report of Committee on Trained Nurses.

TO THE COUNCIL:

Gentlemen,—Your Committee on Trained Nurses begs leave to submit the following report:

In considering the proposed definition of the practice of dentistry as outlined in the law recently submitted to the legislature—as follows: "Practice of dentistry shall consist in operating upon or treating the teeth, alveolar process, gums, or jaws, or in prescribing or advising treatment for disease, ailments, lesions, or any defective condition of the same, or in supplying lost teeth by artificial ones, or in correcting or attempting to correct malpositions or malformation of the teeth, or in making or fitting artificial

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appliances to correct irregularities, malformations, diseases, defects, or ailments of the same, or in examining the mouth with a view to such operating, treating, prescribing, or making of such appliances, or in contracting or agreeing so to treat or operate upon such portions of the mouth or oral cavities, or to make such appliances, or in holding oneself out as a dentist by sign, card, letter, show window, advertisement, or otherwise, or in maintaining an office for such practice; dental office means any place wherein practice of dentistry is advertised or carried on"—your committee is of the opinion that any attempt to provide for trained nurses at this time is ill advised, and would recommend that any action thereon for the present shall be postponed.

Respectfully submitted,

A. C. RICH,
HERBERT L. WHEELER,
W. W. SMITH,
Committee.

Report of Publication Committee.

TO THE COUNCIL:

Gentlemen,—In accordance with the recommendation of the Executive Council given in May 1912, a contract was made with The S. S. White Co. for the publication and distribution of the printed proceedings in the month of February 1913. The bill covering addressing and postage was placed in the hands of the treasurer, Dr. G. H. Butler. Dr. L. P. Anthony, representing The S. S. White Co., will be present to report the proceedings of the present session.

We recommend a renewal for the publication and distribution of the proceedings of 1913, by The S. S. White Co., on the basis of the 1912 agreement.

Respectfully submitted,

A. P. BURKHART, *Chairman.*

Report of Legislative Committee.

TO THE DENTAL SOCIETY OF THE STATE OF NEW YORK:

Mr. President and Gentlemen,—The Legislative Committee begs to submit the following report for the year 1912–13.

During the session of the legislature from January 1 to May 3, 1913, your committee has been extremely active in keeping a close watch of the calendar, in order that any bills that might arise affecting the dental profession, either favorably or unfavorably, might receive the proper attention. In all, six bills affecting the dental profession were introduced in the Assembly and Senate. To two of these I would call your attention.

First, the Walker bill, A. 2331 (Introductory No. 2006) amending section 198 Public Health Law, requiring the Regents to issue without examination or other qualification a dental license to any applicant who has lawfully practiced dentistry for twenty-five years without this state, but within the United States. This bill has passed both Assembly and Senate and is now in the hands of the governor. All the influence that we can possibly obtain is being brought to bear to have the governor veto this measure.

Secondly, the Seeley bill, S. 944 (Introductory No. 854) amended 1753, 2012, and the Tudor bill, A. 1385 (Introductory No. 1274) amended 2392, 2698, 2775, 2809, were defeated. These bills were introduced by the special committee appointed by this society to act jointly with a committee of the Dental Examiners and Board of Regents for the purpose of amending the Dental Practice Act.

Your committee would suggest that, in the future, if special committees whose duty it is to recommend changes in the dental laws would report their proceedings back to the

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Executive Council, much trouble, annoyance, and unpleasantness would be averted. If the Legislative Committee is to do its work in full, it must be respected.

Your committee would also suggest that the Executive Council appoint or authorize the Legislative Committee to appoint competent local counsel in Albany, said counsel to be called upon as the emergencies arise. With such a means at our disposal, we could ably defend or oppose measures affecting the dental profession and at the same time be properly represented at any legislative hearings that might arise.

Respectfully submitted,

LEROY S. BLATNER, *Chairman.*

SPECIAL RESOLUTIONS

Passed at the Forty-fifth Annual Convention of the Dental Society of the State of New York.

RESOLUTIONS BY DR. T. P. HYATT.

Whereas, the services of dentistry are of vital importance to the health and well-being of the people; and

Whereas, in the words of the eminent surgeon Dr. Chas. H. Mayo, "It is evident that the next great step in medical progress in the line of preventive medicine should be made by the dentists"; and

Whereas, there is a movement to establish a Department of Health of the Government of the United States; and

Whereas, to give the proposed National Department of Health adequate efficiency, it is necessary that official recognition be given to the value of dental service in the conservation of the public health; therefore be it

RESOLVED, That the Committee of One Hundred who are presenting this matter to our government shall and hereby are respectfully requested to select five members of the dental profession of America to serve upon this committee; and be it further

RESOLVED, That, in the opinion of the Dental Society of the State of New York, adequate provision should be made in the bill presented by Senator Owen of Oklahoma for the appointment of dentists in the proposed National Department of Health when said department shall be created; and be it further

RESOLVED, That a copy of these resolutions shall be forwarded by the secretary of this society to the Committee of One Hundred, to Senator Owen, and to the President of the United States.

RESOLUTIONS BY DR. R. OTTOLENGUI.

Whereas, Dr. W. J. Morton, a prominent physician of New York City, is now serving a term of imprisonment in the Federal prison at Atlanta; and

Whereas, this Society believes that however technically guilty, Dr. Morton has been more sinned against than sinning; and

Whereas, in the past Dr. Morton has rendered very distinguished services to the progress of dental science; therefore be it

RESOLVED, That this society respectfully petitions the President of the United States, if consistent with his own knowledge of the facts, to extend the clemency of a full pardon to Dr. W. J. Morton; and be it further

RESOLVED, That the secretary forward a copy of these resolutions to the President of the United States.

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REPORTS FROM THE DISTRICT SOCIETIES.

First District.

THE annual meeting of the First District Dental Society was held April 7, 1913, and the following persons were elected officers for the ensuing year:

President—Henry W. Gillett.
Vice-president—S. E. Davenport.
Recording Secretary—Leland Barrett.
Corresponding Secretary—J. Russell Watson.
Treasurer—Bissell B. Palmer, Jr.

Appointed by the board of directors:
Librarian—W. T. VanWinkle.
Curator—Oscar J. Chase, Jr.
Members of Executive Council—Herbert L. Wheeler (regular), New York, and Wilbur M. Dailey (alternate), New York.

The following are the delegates to the State Society: Henry W. Gillett, F. C. Kemple, Waldo Work, and H. S. Dunning, all of New York.

The society shows a slight decrease in size, for while a reasonable number of new members were added, nevertheless the clearing up of "dead wood" for non-payment of dues, and the following deaths reported to me—Alfred Wagner, active; C. F. W. Bödecker, Chas. D. Cook, Henry A. Hull, and C. S. Stockton, all associates—accounts for the net loss.

During the past season, we arranged eight meetings, and there was good attendance at every one.

Respectfully submitted,
LELAND BARRETT, *Rec. Sec'y.*

ACTIVE MEMBERS.

Abel, L. Hosford, 40 E. 41st st.
Adams, Irving F., 160 W. 106th st.
Addelston, Wm. M., 73 E. 92d st.
Agostini, E. M., 23 W. 36th st.
Alexion, Thanos, 153 E. 27th st.
Andrade, Alex., 123 W. 95th st.
Andrews, Chas. L., 39 W. 105th st.
Armstrong, Herbert R., 200 W. 72d st.
Aronson, Geo. G., 507 Fifth ave.
Asch, Andrew J., 331 Madison ave.
Ash, Chas. F., 115 Broadway.
Babcock, Ralph W., 268 Madison ave.
Baker, David C., 516 Fifth ave.
Baker, Edward W., 119 W. 121st st.
Baldwin, Harold L., 40 E. 41st st.
Baldwin, L. C., 167 W. 71st st.
Ballen, Irving J., 164 E. 72d st.
Bark, Arthur W., 779 Madison ave.
Barker, Clinton Reed, 57 W. 50th st.
Barnard, Wm. E., 40 E. 41st st.
Barrett, Leland, 215 W. 116th st.
Bate, Jacob, 758 W. End ave.
Bendernagel, Jas. F., 451 W. End ave.
Benney, Walter, 352 W. 23d st.
Berger, Adolph, 158 E. 79th st.
Berlin, Simon, 22 E. 108th st.
Betzig, Edward P., 417 E. 143d st.
Birkhahn, Alex. M., 57 E. 93d st.
Blakeslee, Geo. W., 157 W. 93d st.
Bleyer, LeRoy Mount, 836 Lexington ave.
Blum, Richard, 576 Fifth ave.
Bogue, Edward A., 63 W. 48th st.
Bogue, Fred. L., 63 W. 48th st.
Bourne, A. R., 174 W. 79th st.
Bowman, Harry, 108 E. 73d st.
Brandt, Henry, 200 W. 113th st.
Brash, W. W., 1554 Broadway.
Breen, John M., 115 E. 17th st.
Browne, Chas. L., 200 W. 57th st.
Brown, Irving W., 171 W. 71st st.
Brown, M. Hart, 1511 E. Chester road.
Brush, F. C., 1181 Broadway.
Bryer, Russell K., 106 E. 57th st.
Bunker, Jane G., 40 E. 41st st.
Burkhardt, Edw. W., 12 Ft. Chas. Pl., Marble Hill.
Burgess, J. Kendall, 40 E. 41st st.
Burke, J. Willard, 246 Fifth ave.

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Burns, Bert A., 331 Madison ave.
Burt, John D., 40 East 41st st.
Burton, I. G., 1183 Broadway.
Butler, E. Santley, 576 Fifth ave.
Buxbaum, A. I. F., 331 Madison ave.
Byers, J. M., 303 Fifth ave.
Campbell, Guy, 253 Columbus ave.
Carleton, S. S., 171 W. 71st st.
Carman, Herman F., 343 E. 142d st.
Carney, Matthew F., 141 Center st.
Carr, Wm., 560 Fifth ave.
Carrabine, Oscar, 542 Fifth ave.
Chaim, Morris L., 1 W. 85th st.
Chase, O. J., Jr., 23 W. 36th st.
Chayes, Herman E. S., 576 Fifth ave.
Chicherio, Francis A., 235 W. 129th st.
Clayton, Walter H., 20 E. 126th st.
Cloud, Agnes D., 449 W. 23d st.
Clune, Jas. G., 210 Lenox ave.
Cohen, Bernhard, 315 Fifth ave.
Colburn, M. L., 600 W. 157th st.
Colding, Henry S., 251 W. 92d st.
Cole, C. Monford, 106 E. 57th st.
Collins, Martin L., 2001 Fifth ave.
Concklin, Edward F., 44 E. 64th st.
Constable, Roy V., Times Building.
Converse, J. S., 42 W. 40th st.
Cowles, Ward H., 1993 Boston road.
Cotton, Waite A., 3750 Broadway.
Crookshank, F. A., 849 E. 156th st.
Cudlipp, Edwin, 167 W. 71st st.
Currie, Alex. W., 40 E. 41st st.
Dailey, Wilber M., 19 E. 69th st.
Danforth, A. G., 55 W. 39th st.
Davenport, R. M., 51 W. 47th st.
Davenport, Sebert E., 51 W. 47th st.
Davenport, Sebert E., Jr., 51 W. 47th st.
Deane, Harry T., 616 Madison ave.
Deane, Wm. C., 616 Madison ave.
Degenhardt, M., 230 W. 97th st.
Delaney, John T., 1378 Lexington ave.
De Sola, S., 333 Central Park West.
de Wolfe, Edward R., 1730 Broadway.
Dills, Wm. B., 140 W. 57th st.
Dixon, Edwin H., 40 E. 41st st.
Draper, Wm. H., 11 E. 48th st.
DuBois, Chas. A., 2025 Broadway.
Dunning, Henry S., 17 E. 38th st.
Dunning, Wm. B., 140 W. 57th st.
Durschang, A. C., 321 E. 17th st.
Easton, B. A., 318 W. 57th st.
Eddy, G. M., 532 Fifth ave.
Elster, Robert E., 201 W. 108th st.
Emerson, C. H., 167 W. 71st st.
Evans, Harry P., 44 E. 64th st.
Evans, George, 55 W. 39th st.
Ernst, Otto, Larchmont.
Ferris, Henry C., 140 W. 57th st.
Fischer, Edward W., 202 74th st.
Fischer, Wm. C., 373 Fifth ave.
Fletcher, C. R., 167 W. 71st st.
Force, Willard B., 576 Fifth ave.
Fossume, Finn S., 616 Madison ave.
Fox, Edward, 252 W. 79th st.
Freedman, Anna G., 275 Central Park West.
Francis, W. E., 47 W. 34th st.
Franken, Sigmund W., 1066 Lexington ave.
Frees, Jacob H., 331 W. 51st st.
Fulton, John G., 66 E. 58th st.
Gardner, Walter H., 1271 Broadway.
Garner, Wm. J., Jr., 516 Fifth ave.
Gates, Albert W., 606 W. 116th st.
Gentle, Robt. B., 108 E. 35th st.
Getz, Forry R., 576 Fifth ave.
Getzoff, Samuel M., 27 E. 81st st.
Gibbs, John R., Jr., 149 Broadway.
Gibson, Kasson C., 115 W. 77th st.
Gies, Carl J., 315 E. 86th st.
Gillett, Henry W., 140 W. 57th st.
Goldberg, Harry A., 222 E. 72d st.
Goode, Gladstone, 576 Fifth ave.
Gottschaldt, Martin C., 40 E. 41st st.
Grace, Thomas M., 167 W. 71st st.
Green, Leo, 44 E. 75th st.
Greenbaum, Leo, 741 Fifth ave.
Greminger, Albert N., 616 Lexington ave.
Griffin, Francis D., 164 W. 73d st.
Gudewill, R. H. E., 30 W. 59th st.
Gunn, Andrew H., 40 E. 41st st.
Haas, Arthur, 911 Park ave.
Haigh, Herbert, 103 W. 70th st.
Hammer, H. F., 69 E. 55th st.
Hargett, Arthur V., 2016 Seventh ave.
Hartman, Wm. N., 167 W. 71st st.
Hartranft, J. L., Beacon Hall, New Rochelle.
Harvitt, Joseph, 214 E. Broadway.
Hasbrouck, Jas. F., 40 E. 41st st.
Hasbrouck, J. Roswell, 171 W. 71st st.
Hassell, Samuel W., 118 W. 71st st.
Hassinger, J., 435 W. 146th st.
Heckard, Wm. A., 489 Fifth ave.
Heinzer, Edward A., 25 W. 42d st.
Heller, Chas. A., 171 E. 116th st.
Hellman, Milo, 40 E. 41st st.
Herbst, Max, 4 New Chambers st.
Hermans, James, 167 W. 71st st.
Herbert, Wm. C., 576 Fifth ave.
Herzog, James R., 54 E. 93d st.

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Hess, Samuel, 818 Lexington ave.
Higgins, John H., 43 E. 25th st.
Hills, Wm. B., 307 E. 18th st.
Hoag, Wm. J., 527 Fifth ave.
Hobby, G. W., 167 W. 71st st.
Hoblitzell, C. M., 431 Convent ave.
Holdridge, P. A., 126 W. 127th st.
Houston, H. C., 69 Sixth ave.
Howe, Frank Morgan, 113 E. 60th st.
Howe, John Morgan, 576 Fifth ave.
Howells, Edwards W., 107 W. 48th st.
Hull, Geo. A., 123 W. 73d st.
Hull, Henry J., 40 E. 41st st.
Hussa, Philip, 40 E. 41st st.
Hutchinson, R. G., Jr., 11 E. 48th st.
Hyland, J. D., 200 W. 70th st.
Igel, Victor, 2127 Hughes ave.
Ireland, Alice J., 44 W. 47th st.
Irving, Wm. W., 40 E. 41st st.
Jackson, Victor H., 40 E. 41st st.
Jenkins, G. R., 40 E. 41st st.
Jernigan, Geo. F., 61 W. 56th st.
Jones, Lawrence A., 2 Wall st.
Karmiohl, Jacob, 340 E. 72d st.
Kaplan, Emanuel M., 136 Liberty st.
Kauffer, H. J., 112 W. 72d st.
Keith, Ross H., 1161 Broadway.
Kelly, O. R., 200 W. 72d st.
Kelly, Frank J., 576 Fifth ave.
Kelsey, Ernest A., 2001 Fifth ave.
Kemple, Frederick C., 576 Fifth ave.
Kempton, J. F., 69 W. 130th st.
Kennard, Louis W., 542 Fifth ave.
Kennedy, Clement D., 119 E. 60th st.
Kessler, Samuel J., 313 Broome st.
Kimball, C. Denney, 40 E. 41st st.
Kimball, Chas. Otis, 40 E. 41st st.
Knecht, Wm. D., 40 E. 41st st.
Kohn, Alfred L., 111 W. 118th st.
Krows, Earl, 126 W. 126th st.
Kreisler, David, 95 W. 119th st.
Kyle, Wm. G., 105 W. 40th st.
Lambert, H., 122 E. 74th st.
Lang, Joseph, 66 E. 58th st.
La Roche, Montgomery, 704 Madison ave.
Leggett, Geo. H., 133 W. 123d st.
LeRoy, Louis C., 38 W. 50th st.
Lester, Wm. B., Park Row Building.
Levy, Joseph M., 1277 Madison ave.
Liebrecht, Chas. F., 203 W. 81st st.
Lindsay, Harley B., 40 E. 41st st.
Linton, Chas. C., 40 E. 41st st.
Litten, Arthur S., 238 W. 78th st.
Locherty, Jas. B., 109 W. 45th st.
Loomis, H. J., 61 W. 37th st.
Lowenstein, Julius, 971 Second ave.
Lowenstein, M. S., 2 W. 94th st.
Ludington, Robert B., 40 E. 41st st.
McCormick, Herbert V., 26 Cortlandt st.
McKenzie, James, Jr., 57 W. 84th st.
McLaren, Francis J., 127 W. 48th st.
McNaughton, Stuart A., 63 W. 49th st.
McNeille, Chas. S., 500 Fifth ave.
McNeille, Percy R., 500 Fifth ave.
Macdonald, Wm. D., 576 Fifth ave.
Madsen, M. P., 201 W. 94th st.
Mann, Joseph, 317 2d ave.
Manney, G. A., 101 E. 92d st.
Manville, Geo. P., 576 Fifth ave.
Marco, B. Barrymore, Hotel Ansonia.
Marshall, H. G., 144 W. 126th st.
Mattes, Otto, 241 W. 14th st.
Matteson, George E., 150 W. 104th st.
Mayer, Joseph H., 124 E. 92d st.
Meeker, John B., 253 W. 85th st.
Mehlig, Carl F. C., 527 Fifth ave.
Merritt, Arthur A., 59 W. 46th st.
Metzger, Otto I., 44 W. 95th st.
Meyer, John H., 161 W. 71st st.
Miller, Alonzo B., 542 Fifth ave.
Miller, Arthur, 2880 Broadway.
Minner, Edmund E., 144 W. 92d st.
Mishnun, Harry, 601 W. 137th st.
Mitchell, Vethake E., 23 W. 36th st.
Mobley, Lewis K., 46 W. 51st st.
Moolten, Raphael J., 13 Astor Place.
Mork, Waldo H., 2091 Washington ave.
Morse, Daniel E., 1068 Lexington ave.
Moss, Michael L., 307 E. 86th st.
Nash, Benj. C., 143 W. 81st st.
Nash, Louis, 17 E. 38th st.
Newgarden, Charles, 564 W. 160th st.
Niles, F. B., 2139 7th ave.
Noll, Joseph A., 501 W. 138th st.
Northrop, H. W., 546 Fifth ave.
Nodine, Alonzo M., 1 W. 34th st.
O'Brian, L. A., 542 Fifth ave.
Ogden, Harry B., 130 W. 57th st.
Onderdonk, Thos., 542 Fifth ave.
Ottolengui, R., 80 W. 40th st.
Palmer, B. B., Sr., 220 W. 98th st.
Palmer, Bissell B., Jr., 40 E. 41st st.
Palmer, Corydon, 48 W. 50th st.
Palmer, Delos, 48 W. 50th st.
Palmer, Geo. B., 40 E. 41st st.
Palmer, Leslie E., 140 W. 57th st.
Parker, Horace J., 40 E. 41st st.
Paulsen, M. A., 2041 Fifth ave.

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Paulsen, A. F., 441 Tremont ave.
Pease, J. Grant, 61 W. 74th st.
Peeso, Fred. A., 542 Fifth ave.
Perez, José G., 315 Fifth ave.
Perkins, Bertram R., 40 E. 41st st.
Peters, August L., 125 E. 64th st.
Peters, Henry H., 167 W. 71st st.
Peters, John L., 250 W. 74th st.
Philips, F. L., 1125 Madison ave.
Prentiss, Elias B., 130 W. 57th st.
Polhamus, Agnes I., 98 Morningside ave.
Quedenfeldt, Paul B. H., 570 Bergen ave.
Rachliss, Nathan H., 859 Beck st., Bronx.
Rabell, Chas. F., 134 W. 22d st.
Rabell, Chas. Francis, 40 E. 41st st.
Randolph, W. F., 1328 Broadway.
Ranhofer, Edward J., 65 W. 70th st.
Rathfelder, G. C., 318 W. 116th st.
Raymond, E. H., Jr., 542 Fifth ave.
Refsum, Joseph, 715 Madison ave.
Reitz, Ralph B., 576 Fifth ave.
Remington, Frank A., 57 W. 49th st.
Requa, J. Eugene, 616 Madison ave.
Rettich, Hugo, 52 W. 68th st.
Rhein, M. L., 38 E. 61st st.
Rice, Geo. E., 11 E. 48th st.
Richardson, C. C., 2491 Broadway.
Riggs, Wm. D., 11 E. 48th st.
Rivinius, Julius W., 173 W. 73d st.
Robinson, Edwin S., 28 W. 39th st.
Roche, Thos. H., 234 W. 98th st.
Ros, Osvaldo, 452 Fifth ave.
Rosenbaum, Wm., 124 W. 114th st.
Rosenstiel, Louis S., 634 Lexington ave.
Rosalsky, Harry W., 100 W. 115th st.
Root, John A., 37 E. 28th st.
Rothkranz, Wm. C., 45 W. 34th st.
Rouse, Arthur G., 576 Fifth ave.
Roy, Frank Austin, 527 Fifth ave.
Roy, Harold E., 527 Fifth ave.
Ruyl, Jas. P., 40 E. 41st st.
Salsbury, Henry L., 113 W. 85th st.
Sanford, Edward A., 505 Fifth ave.
Schamberg, Morris I., 116 W. 59th st.
Schwamm, Henry, 174 E. 74th st.
Scobey, Harry C., 56 W. 56th st.
Scott, Charles F., 17 E. 38th st.
Senior, Eugene, 333 Central Park, W.
Shaw, Geo. M., 40 E. 41st st.
Sheckter, Samuel J., 1849 Madison ave.
Sherry, Ernest, 1840 7th ave.
Shields, Nelson T., 61 W. 56th st.
Short, Wm. B., 176 W. 72d st.
Simon, Samuel, 794 Lexington ave.
Sinnigen, Walter C., 560 Fifth ave.
Sisson, Henry H., 40 E. 41st st.
Skalmer, M., 124 E. 95th st.
Skidmore, J. L., 250 W. 74th st.
Smith, Edward C., 23 W. 36th st.
Smith, Fred. E., 66 W. 49th st.
Smith, F. Milton, 63 W. 48th st.
Smith, Karl C., 576 Fifth ave.
Solow, L. J., 1239 Madison ave.
Spencer, H. W., 437 Fifth ave.
Spengeman, Percy G., 400 W. 152d st.
Stack, Wm. H., 488 Tremont ave.
Stanton, Fred'k L., 28 W. 39th st.
Stark, A. Burton, 505 Fifth ave.
Starr, Alfred Russell, 10 E. 92d st.
Steffens, Chas., 133 W. 72d st.
Stein, Gustave R., 144 W. 123d st.
Stern, Henry G., 3671 Broadway.
Stier, Julius J., 226 W. 78th st.
Stoney, Arthur C., 515 Madison ave.
Storck, S. O., 57 W. 58th st.
Strance, A. G., 44 W. 96th st.
Strohmeyer, Joseph J., 167 W. 71st st.
Strong, Irving E., 1059 Tinton ave.
Sutherland, Arnold H., 28 W. 39th st.
Sweeney, Thos. F., 973 Lexington ave.
Sweetser, R. W., 18 W. 34th st.
Swift, Arthur L., 140 W. 57th st.
Sylla, E. W., 1271 Broadway.
Swift, Thomas C., Mt. Vernon.
Taylor, C. S., 102 W. 93d st.
Taylor, J. Ostram, 592 E. 165th st.
Taylor, James W., 106 E. 57th st.
Taylor, Herbert W., 58 W. 50th st.
Terrell, Geo. B., 40 E. 41st st.
Terry, Winfield C., 140 E. 92d st.
Thompson, Daniel B., 214 W. 71st st.
Throop, Harold M., 560 Fifth ave.
Tooley, Francis L., 157 E. 79th st.
Tousey, Sinclair, 140 W. 57th st.
Tracy, Martin C., 46 W. 51st st.
Tracy, Wm. Dwight, 46 W. 51st st.
Turcot, F. G., 546 Fifth ave.
Turner, Frederick C., 505 Fifth ave.
Turner, W. J., 19 W. 54th st.
Van Horne, Herman E., 47 W. 34th st.
Van Saun, S. W., 250 W. 74th st.
Van Winkle, W. T., 59 W. 46th st.
Vaughan, Harold S., 616 Madison ave.
Vaughan, Ray G., 11 E. 48th st.
Vetter, Charles, 2 W. 88th st.
Tompkins, Heman E., 177 W. 126th st.
Vuilleumier, J. A., 58 E. 58th st.
Waddell, R. W., 45 W. 34th st.

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Wald, Armin, 323 East 86th st.
Walker, Wm. Wallace, 58 W. 50th st.
Walker, Alfred S., 295 Central Park West.
Walther, Arno W., 231 W. 97th st.
Wardwell, Claison S., 576 Fifth ave.
Watson, John Russell, 576 Fifth ave.
Webster, William Lloyd, 101 W. 78th st.
Weed, Thos. M., 464 W. 145th st.
Wehrenberg, W. D., 2131 Broadway.
Weld, Geo. W., 127 W. 48th st.
Westbay, Henry E., 219 W. 71st st.
Wheeler, C. W. B., The Professional Building, Madison ave. and 38th st.
Wheeler, Herbert L., 560 Fifth ave.
Wheeler, Isaiah N., 60 W. 51st st.
White, W. D. J., 331 Madison ave.
Whitlock, W. Melvin, 11 E. 48th st.
Wilcox, Geo. L., 167 W. 71st st.
Willcox, Harry, 516 Fifth ave.
Willis, Geo. P., 949 Lexington ave.
Wilson, Geo. A., 542 Fifth ave.
Wilson, Geo. A., Jr., 516 Fifth ave.
Wilson, Lawton H., 51 W. 51st st.
Wollison, R. M., 576 Fifth ave.
Woodman, Edward A., 457 E. 178th st.
Wright, Chas. D., 57 W. 50th st.
Young, J. Lowe, 576 Fifth ave.
Zentler, Arthur, 527 Fifth ave.
Zimmerman, G. H., 243 W. 135th st.
Zweig, Jacob, 115 W. 119th st.

HONORARY MEMBERS.

Ainsworth, George C., 220 Clarendon st., Boston, Mass.
Andrews, Prof. R. R., 1306 Massachusetts ave., Cambridge, Mass.
Berens, T. Passmore, 35 Park ave., New York City.
Black, G. V., Chicago, Ill.
Brophy, Truman W., 756 W. Harrison st., Chicago, Ill.
Breneman, A. A. (Ph.D.), 97 Water st., New York City.
Bryan, L. C., 1 St. Albananlage, Basel, Switzerland.
Bryant, William S., 57 W. 53d st., New York City.
Case, Calvin S., 1120 Stewart Building, Chicago, Ill.
Croll, W. L., 14 Lower Berkeley st., Portman Sq. W., London, Eng.
Cryer, Matthew H., Univ. of Penna., Phila., Pa.
Darby, Edwin T., 1632 Walnut st., Philadelphia, Pa.
Davenport, I. B., 30 Ave. de l'Opéra, Paris, France.
Dawbarn, R. H. M., 105 W. 74th st., New York City.
Delevan, D. Bryson, 1 E. 33d st., New York City.
Elliott, W. St. George, 331 Madison ave., New York City.
Farrar, John Nutting, 1271 Broadway, New York City.
Gaylord, Edward S., 63 Trumbull st., New Haven, Conn.
Goadby, Kenneth Weldon, 21 New Cavendish st., London W., Eng.
Godon, Charles, 40 Rue Vignon, Paris, France.
Goslee, Hart J., 92 State st., Chicago, Ill.
Grevers, John E., University of Utrecht, Holland.
Gysi, Alfred, Zurich, Switzerland.
Harmstad, Frank C., Jersey City, N. J.
Harvey, L. F., 19 W. Tupper st., Buffalo, N. Y.
Hatch, Henry D., Temple, Maine.
Head, Joseph, 1500 Locust st., Philadelphia, Pa.
Herbst, Wilhelm, Bremen, Germany.
Hodson, J. F. P., 50 W. 45th st., New York City.
Ingersoll, Laman C., Keokuk, Iowa.
Jack, Louis, Media, Pa.
Jarvie, William, The Montclair, Montclair, N. J.
Kirk, Edward C., Chestnut and Twelfth sts., Philadelphia, Pa.
Lewis, F. Parke, 464 Franklin st., Buffalo, N. Y.
Lloyd-Williams, E., 11 Buckingham Gate, London S. W., Eng.
McManus, James, 80 Pratt st., Hartford, Conn.
Marshall, John S., care Surgeon General's Office, Washington, D. C.
Miller, Charles W., West Falmouth, Mass.
Morton, William J., 19 E. 28th st., New York City.
McQuillen, Daniel Neill, Philadelphia, Pa.

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Newton, Richard C., Church st., Montclair, N. J.
Ormiston, Robert, 117 South Elliot Place, Brooklyn, N. Y.
Osborn, Prof. H. F., American Museum of Natural History, and 850 Madison ave., New York City.
Phillips, Wendell C., 40 W. 47th st., New York City.
Pullen, H. A., 274 Allen st., Buffalo, N. Y.
Shepard, L. D., Boston, Mass.
Stockwell, C. S., Springfield, Mass.
Taggart, William H., Masonic Temple, Chicago, Ill.
Tomes, Charles S., 12 Welbeck House, Wigmore st., London, Eng.
Truman, James, 4505 Chester ave., Philadelphia, Pa.
Waite, W. H., 10 Oxford st., Liverpool, Eng.
Weber, Leonard, 25 W. 46th st., New York City.
Williams, J. Leon, 30 George st., Hanover Sq., London, Eng.
Wilson, Frederick N., 3 E. 48th st., New York City.
Wortman, Prof. J. L., Yale University Museum, New Haven, Conn.
Younger, William J., Paris, France.

Second District.

THE annual meeting of the Seecond District Dental Society was held April 4, 1913, and the following persons were elected officers for the ensuing year:

President—Warrington G. Lewis.
Vice-president—W. W. Thompson.
Recording Secretary—Edwin A. Holbrook.
Corresponding Secretary—Walter S. Watson.
Treasurer—C. M. Norcom.
Librarian—T. A. Quinlan.
Members of Executive Council—H. P. Gould (regular), Brooklyn, and Wm. N. Frazer (alternate), Brooklyn.

The following are the delegates to the State Society: For four years, F. A. Gough and W. H. Rogers; for three years, LeRoy C. Edwards and Edwin A. Holbrook.

The following were appointed to serve on State Society committees: A. S. Johnson (Law); F. O. Kraemer (Legislative); A. H. Stevenson and Wm. N. Frazer (Oral Hygiene).

Seven regular meetings were held, at which the following papers were read: "Difficult Problems in Operative and Prosthetic Dentistry Solved by Casting," by Dr. W. D. Moore of Chicago. "The Value of Radiography in General Dental Practice," by Dr. G. M. MacKee of New York. "Orthodontia for the General Practitioner," by Dr. Abram Hoffman. "The Technique of Hand-carved Porcelain Crowns," by Dr. Chas. K. Buell of Buffalo. "The Restoration of Occlusion by the Casting Process," by Dr. J. Lowe Young of New York.

Two members have been lost by death—Dr. E. D. Fuller of Peekskill, and Dr. C. E. Moore of Brooklyn. Four members resigned. Fourteen new members were added to our roll.

Dr. O. E. Houghton and Dr. E. G. Parker were elected to life membership.

Respectfully submitted,

EDWIN A. HOLBROOK, *Rec. Sec'y.*

ACTIVE MEMBERS.

(Resident in Brooklyn unless otherwise specified.)

* Member State Society.

Abbott, F. P., 33 Cambridge Place.
Allen, C. C., 138 Clinton st.
Allen, N. H., 444 Franklin ave.
Allyn, F. L., Woodhaven, L. I.
Arvine, F. B., 793 Lincoln Place.
*Ash, Chas. F., 115 Broadway, New York City.
*Babcock, E. H., 184 Joralemon st.
Bade, Henry, 136 Halsey st.
Barker, D. W., 87 Lafayette ave.
Barnes, F. D., 178 Stuyvesant ave.
Bauer, August F., 154 Nassau st., New York City.
Beissel, W. J., 1004 Broadway.

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Benney, W., 352 W. 23d st., New York City.
Berendsohn, E. H., 204 Berkeley Place.
Berendsohn, W. A., 598 Carlton ave.
Bishop, C. G., 127 Halsey st.
Bornman, Carl F., 271 Putnam ave.
Boudin, Anna P., 477 E. 16th st.
Bower, T. B., 450 Grand ave.
Bowman, S. J., 417 56th st.
Boylhart, Fred'k H., 129 St. Felix st.
*Brown, Byron, 77 Hanson Place.
Brown, J. B., 80 Lafayette ave.
*Buckley, W. A., Liberty, N. Y.
Burgess, F. L., Huntington, L. I.
Bush, W. N., 368 Putnam ave.
Bush, C. A., 126 Hancock st.
Campbell, D. K., 436 Gold st.
Carpenter, Walter Titus, 191 Ryerson st.
Cary, W. B., 23 Flatbush ave.
Childs, H. M., 110 S. Elliott Place.
Clark, Robert H., 350 Carlton ave.
Clark, W. G., 103 Montague st.
Clark, W. P., 26 Seventh ave.
Clasing, J. F. W., 283 President st.
Clayton, Furman, 469 Franklin ave.
*Croscup, H. C., 327 Sterling Place.
Cuinet, L. A., 152 Henry st.
Davis, George E., 1612 Broadway.
Dayton, C. R., 488 Nostrand ave.
Deale, W. H., Babylon, L. I.
De Bar, William, 258 Ovington ave.
Delsarte, L. J., 505 Vanderbilt ave.
Desnoes, A. M., 488 Nostrand ave.
*Dills, W. B., 140 W. 57th st., New York City.
Douglass, G. C., 877 Greene ave.
Edwards, LeRoy S., 113 S. Elliott Place.
Engel, P. B., 10 Stuyvesant ave.
Engel, W. F., 10 Stuyvesant ave.
Ewald, Martha R., 1211 ave. N.
Farmer, G. P., 452 Nostrand ave.
*Ferris, H. C., 1166 Dean st.
Filler, Julius, 68 McKibben st.
Filler, Samuel H., 353-a Vernon ave.
Finney, J. H., 333 McDonough st.
Fischler, Bernard, 120 Reid ave.
Foote, A. Freeman, 149 Greene ave.
*Frazer, Wm. N., 184 McDonough st.
Fuchs, W. J., 34 Jefferson ave.
Fuller, D. A., 184 Joralemon st.
Fuller, Z. P., 110 S. Elliott Place.
Gardner, G. Wilbur, 154 Clinton st.
Gelson, J. Norbert, 673 Vanderbilt ave.
Gilcrest, H. C., Nyack, N. Y.
Gilman, R. E., 33 Lafayette ave.
Glenzer, J. A., 593 Hancock st.
Gomer, Charles A., 770 Willoughby ave.
Gough, F. A., 184 Joralemon st.
*Gould, Horace P., 193 Joralemon st.
Green, H. C., 228 Cumberland st.
Griesmer, M. F., 364 McDonough st.
Gunton, Leonard M., 1 Sidney Place.
Haley, J. F., 840 Herkimer st.
Halsey, W. E., 203 Jefferson ave.
*Hamlet, F. P., Hempstead, L. I.
Hankinson, M. C., 201 Schermerhorn st.
*Hanning, J. H., 1085 E. 18th st.
Harby, R. D., 792 Lincoln Place.
Heath, Henry, Jr., 64 Hancock st.
Helig, S. E., 232 Flatbush ave.
Hesse, Carl G., 1159 Broadway.
*Hillyer, Ellison, 1143 Dean st.
Hoch, B. L., 130 Reid ave.
Holbrook, E. A., 148 Hancock st.
Holmbee, B., 389 Clinton st.
Holmes, J. H., 107-a Halsey st.
Holmes, H. B., 103 Halsey st.
Hopkins, S. P., 184 Joralemon st.
Hull, P. L., Jamaica, L. I.
Husch, Jacob, 269½ Vernon ave.
*Huskinson, Ernest C., 1246 Pacific st.
*Hyatt, T. P., Professional Building, 17 E. 38th st., New York City.
*Jarvie, Wm., 105 Clinton st.
Jereissati, K. M., 184 Clinton st.
Johnson, A. S., 621 St. Marks ave.
Johnson, G. B., 380 Pacific st.
*Johnston, W. H., 35 Ft. Greene Place.
Kaletsky, C. M., Jamaica, L. I.
Keowen, S. S., 24 New York ave.
*Keppy, F. B., 62 Hancock st.
Ketcham, F. S., 141 Hancock st.
King, Horace W., 85 Main st., Flushing, L. I.
King, Henry A., 446-a Hancock st.
Knight, G. W., 28 Cambridge Place.
Knox, J. T., 215 Montague st.
Könecke, G. Harry, 188 Van Buren st.
*Kraemer, F. O., 225 Schermerhorn st.
Kraemer, F. O., Jr., 225 Schermerhorn st.
Kregeloh, H. A., 170 N. 6th st.
*Lanchantin, E. F., 360 9th st.
Lando, S. A., Carona, L. I.
LaBorne, Chas. H., 781 Manhattan ave.
Lawrence, W. E., 1 Revere Place.
Leif, J. F., 12 Graham ave.
Lehmann, E., 194 Ridgewood ave.
Leonard, M. D., 854 Flatbush ave.
Leonard, R. G., 854 Flatbush ave.
Leprohon, J. B., 105 Quincy st.
*Lewis, Warrington G., 184 Joralemon st.
Long, Orville S., 793 Ocean ave.

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Lundgren, C. J., 1241 Broadway.
Malcolm, James A., Oyster Bay, L. I.
Mapp, C. J., 44 Court st.
Marshall, E. W., 144 Park Place.
Master, C. M., Flushing, L. I.
Matt, O. T., 696 Park Place.
McNeill, E. W., 65 St. Johns Place.
Megaw, Elmer E., 1166 Dean st.
Merwin, R. E., 796 Carroll st.
Michnoff, S. J., Bay Shore, L. I.
Miller, Frank Henry, 310 Cumberland st.
Miller, F. H., 562 Bainbridge st.
Miller, Irving U., 284 Henry st.
Molatch, George, 471 56th st.
Morris, Frank, 1151 Dean st.
Morris, W. A., 657-a Macon st.
Morrison, E. V., 67 Hanson Place.
Muth, George H., 1124 Ocean ave.
Newton, H. A., 151 Clinton st.
Nies, F. H., 37 Summit st.
Nodine, A. M., 1 W. 34th st., New York City.
Norcom, C. M., 1187 Bergen st.
O'Brien, H. L., 104 Prospect Park W.
Orr, C. W., 100 Hanson Place.
Orth, F. C., Woodhaven, L. I.
*Ottolengui, R., 80 W. 40th st., New York City.
Parker, C. B., 154 Clinton st.
Parker, DeWitt L., 178 State st.
Parker, V. F., 124 Montague st.
Passwell, B., 53 Woodbine st.
Perlie, H. E., 1417 G st., N. W., Washington, D. C.
Peterson, J. O., 216 Bergen st.
Peterson, T. O., 429 Bergen st.
Phillips, P. J., 129 S. Oxford st.
Powell, J. K., Jr., 175 Hancock st.
Provost, W. D., 80 Lafayette ave.
Quackenbush, Hattie W., 144 Lawrence st.
Quinlan, J. S., 76 6th ave.
*Quinlan, T. A., 463 Fulton st.
Quinn, A. M., 16 Seventh ave.
Reese, R. H., 103 Macon st.
Riggs, W. C., 67 Hanson Place.
*Rippier, E. T., 354 9th st.
Ritt, Adolph, 1621 Pitkin ave.
Rogers, W. H., 506 Hancock st.
*Royce, F. C., 65 Greene ave.
Russell, J. W., 6 Plaza st.
*Ruyl, J. P., 18 Ashford st.
Sanbern, Frank, 184 Joralemon st.
Sanderson, R. H., 76 Rogers ave.
*Sandhusen, George, 298 Cumberland st.
Scheiner, Carl, 1829 Gates ave.
*Schmidt, J. A., 1195 Dean st.
Schwerdtfeger, J. H., 607 Bedford ave.
Schofield, F. E., 87 Macon st.
Schofield, W. L., Brewster, N. Y.
Seaver, A. D., 134 Park Place.
Sexton, E. K., 632 Throop ave.
Seyfarth, G. E., 17 Palmetto st.
Shankroff, L., 343 Jefferson ave.
Shapiro, Simon, 430 Stone ave.
Shapiro, Benjamin, 1480 Eastern Parkway.
Shea, Bernard F., 324 Stuyvesant ave.
Shields, J. S., 585 Jefferson ave.
*Siqueland, Theo., 260 President st.
Smith, C. E., Mineola, L. I.
Smith, D. L., Far Rockaway, L. I.
Smith, W. Mortimer, 167 Kingston ave.
Snyder, L. A., 433 Fulton st.
Solomons, J. R., 200 Quincy st.
Springsted, J. W., 152 Noble st.
Steinbuch, Wm., 940 Bushwick ave.
*Stevenson, A. H., 1202 Cortelyou road.
*Stillman, P. R., 115 Broadway, New York City.
Stillman, E. E., 178 Prospect Park W.
Stillman, J. C., 184 Joralemon st.
Stoltze, V. A., 537 Bedford ave.
Strong, W. A., 209 Schermerhorn st.
Sullivan, J. E., 360 Tompkins ave.
Sullivan, W. F., 1026 Bedford ave.
Thompson, W. W., 383 Hancock st.
Toshack, E. W., 1563 Broadway.
*Turner, Wm. J., 105 Clinton st.
Tuttle, J. H., Jr., 475 Tompkins ave.
Van Note, F. L., 512 Ocean ave.
Van Orden, Chas. A., 144 Lawrence st.
*Van Woert, F. T., 184 Joralemon st.
Van Woert, C. T., 184 Joralemon st.
Voelker, Charles C., 899 Union st.
*Walker, F. C., 309 State st.
Wallace, E. C., 57 Morton st.
Warden, F. E., 242 McDonough st.
Washburn, E. P., 416 50th st.
Watson, Walter S., 5 McDonough st.
Weiskotten, R. H., 133 Hewes st.
Wengorovius, W. R., 475 Tompkins ave.
Whaley, E. G., 642 Park Place.
Whitcomb, C. B., 148 Hancock st.
White, M. E., 203 Spencer st.
White, G. W., 309 13th st.
Wicks, J. V. P., 108 Ft. Greene Place.
Wintkracken, J. C., 269 Carlton ave.
Wolf, P. F., 1559 Broadway.
Wood, John, 38 Halsey st.
Wyckoff, J. R., 279 Madison st.
Zametkin, Joel M., 291 Knickerbocker ave.

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HONORARY MEMBERS.

Cook, Chas. D., 136 Clinton st.
Goslee, H. J., Chicago, Ill.
Hutchinson, R. G., Jr., 11 E. 48th st.
*Jackson, V. H., 40 E. 41st st., New York.
Jenkins, N. S., Paris, France.
Taggart, W. H., Chicago, Ill.

LIFE MEMBERS.

*Emerson, F. S., 632 Bedford ave.
Holly, R. T., 155 Montague st.
Houghton, O. E., 126 S. Oxford st.
Parker, E. G., Goshen, N. Y.
Ramsdell, W. M., Oxford, Chenango Co., N. Y.

Third District.

THE annual meeting of the Third District Dental Society was held April 22, 1913. The following were elected officers for the ensuing year:

President—H. G. Kittell, Troy.
Vice-president—Geo. Vanderpool, Albany.
Recording Secretary—J. W. Canaday, Jr., Albany.
Corresponding Secretary—J. H. Carter, Cohoes.
Treasurer—P. S. Oakley, Troy.
Editor—W. A. Hudson, Albany.
State Dental Examiners (terms to expire 1917)—A. M. Wright and L. S. Blatner.
Members of Executive Council—J. W. Canaday, Sr. (regular) and F. F. Hawkins (alternate).

The following were elected to serve on State Society committees: A. M. Wright (Law); L. S. Blatner (Legislative); M. J. Barrett and M. Van Loan (Oral Hygiene).

One of our members, Dr. G. H. Caddick, removed to New York City during the past year to become associated with Dr. C. W. B. Wheeler of 17 E. 38th st.

We lost one member by death, Dr. Frank Schermerhorn of Cohoes.

One new member was elected, Dr. Pierre Le Blanc of 65 N. Pearl st., Albany.

Respectfully submitted,
J. W. CANADAY, JR., *Rec. Sec'y.*

ACTIVE MEMBERS.

Alderoft, J. G., Hudson.
Allen, C. E., Albany.
Ames, F. L., Albany.
Amyot, B. E., Cohoes.
Amyot, J. A., Troy.
Appleton, G. N., Albany.
Appleton, J. L., Albany.
Barrett, M. J., Troy.
Bennett, E. A., Catskill.
Bird, C. H., Troy.
Bishop, C. H., Kingston.
Blatner, L. S., Albany.
Boudrias, L., Cohoes.
Bookstein, L. H., Albany.
Brown, L. T., Cobleskill.
Burke, M. R., Cohoes.
Canaday, J. W., Albany.
Canaday, J. W., Jr., Albany.
Carter, C. D., Kingston.
Carter, J. H., Cohoes.
Cragin, C. B., Kingston.
Conkling, W. A., Catskill.
Doyle, T. A., Albany.
Ellis, Richard, Troy.
Englert, G. A., Catskill.
Fallon, H. C., Troy.
Fletcher, G. A., Albany.
Gallico, J. E., Troy.
Garvey, P. S., Hudson.
Hawkins, F. F., Troy.
Hine, J. W., Albany.
Hudson, W. A., Albany.
Ketner, F. W., Hudson.
Kirwan, M. F., Albany.
Kittell, H. G., Troy.
Knauff, E. G., Troy.
Le Blanc, Pierre, Albany.
Lewis, A. C., Albany.

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Lynam, H. D., Troy.
McCarthy, W. E., Troy.
McCormick, J. J., Troy.
Mann, Josiah, Middleburgh.
Michael, R. C., Troy.
Norton, A. J., Saugerties.
Nelson, H. G., Troy.
Oakley, P. S., Troy.
Rowe, M. L., Albany.
Reardon, J. J., Hoosick Falls.
Rieger, A. B., Cohoes.
Rowley, H. S., Hoosick Falls.
Scott, J. A., Rensselaer.
Sullivan, G. A., Albany.
Vanderpool, Geo., Albany.
Van Vleck, C. K., Hudson.
Van Loan, M., Albany.
Warren, W. A., Watervliet.
Wheeler, C. F., Saratoga.
Whitbeck, T. H., Albany.
Whitney, S. W., Albany.
Wright, A. M., Troy.
Young, E. J., Troy.
Young, G. B., Troy.

HONORARY MEMBERS.

Angle, E. H., New London, Conn.
Shields, N. T., New York City.
McKay, Jos., Troy.

Fourth District.

THE forty-fifth annual meeting of the Fourth District Dental Society was held in Schenectady, N. Y., April 15, 1913. Thirty-five members responded to roll-call. B. F. Carpenter of Whitehall, N. Y., John A. Munroe of Saranac Lake, and L. C. Gabler of Schenectady, were elected to membership.

The following were elected officers for the ensuing year:

President—S. A. Demarest, Glens Falls.
Vice-president—A. T. Sitterly, Schenectady.
Secretary—Earl Timeson, Schenectady.
Corrcspondent—L. A. Timerman, Fort Plain.
Treasurer—O. J. Gross, Schenectady.
Librarian—(Sec'y.)
State Dental Examiners (term to expire 1915)—O. J. Gross, Schenectady.
Member of Executive Council—Dr. A. C. Rich (regular), Saratoga, term to expire 1915.

The following were appointed to serve on State Society committees:

W. E. Snyder (Law); E. B. Rhinehart (Legislative); and A. S. Moore and L. A. Timerman (Oral Hygiene).

Earl Timeson and J. D. Maloney were nominated for permanent members of the State Society.

Respectfully submitted,
EARL TIMESON, *Rec. Sec'y.*

ACTIVE MEMBERS.

Alexander, Wm. H., Johnstown.
Amyot, P. A., Schenectady.
Barraclough, J., Hudson Falls.
Brown, Geo., Glens Falls.
Carpenter, B. F., Whitehall.
Clark, F. P., Mechanicsville.
Coleman, S. E., Malone.
Colgrove, W. H., Johnstown.
Collins, J. A., Glens Falls.
Collins, J. H., Granville.
Cooney, F. S., Schenectady.
Day, F. C., Lake Placid.
Demarest, S. A., Glens Falls.
Fielding, F. A., Glens Falls.
Foote, Le Roy, Saratoga.
Foote, N. E., Whitehall.
Foulds, T. H., Glens Falls.
Githins, W. L., Fort Edward.
Goetz, St. Elmo, Schenectady.
Gabler, L. O., Schenectady.
Grennan, F. S., Schenectady.
Gregg, H. V., Schenectady.
Gross, O. J., Schenectady.
Hastings, J. M., Saratoga.
Hawley, F. A., Waterford.
Haymen, H. A., Glens Falls.
Hiney, G. H., Cambridge.
Hodder, C. A., Canajoharie.
Hull, J. B., Schenectady.
Hurley, D. E., Warrensburg.

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Jackson, H. C., Schenectady.
Lord, C. N., Schenectady.
Mabie, W. A., Amsterdam.
Maloney, J. D., Hudson Falls.
McCann, A. H., Glens Falls.
McCulloh, S. B., Gloversville.
Merrihew, P. P., Delanson.
Moore, A. S., Schenectady.
Munroe, J. A., Saranac Lake.
Petrie, R. C., Johnstown.
Powers, N. C., Saratoga.
Rhinehart, E. B., Schenectady.
Rich, A. C., Saratoga.
Roach, H. M., Glens Falls.
Roberts, D. S., Gloversville.
Rose, W. S., Schenectady.
Sayre, R. D., Gloversville.
Senecal, A. G., Plattsburg.
Shannon, Geo. H., Cambridge.
Shaw, E. D., Gloversville.
Sitterly, A. T., Schenectady.
Steer, H. G., Fort Plain.
Ston, A. H., Salem.
Snyder, W. E., Amsterdam.
Stowitts, H. M., Amsterdam.
Tibbetts, W. H., Ballston Spa.
Timeson, Earl, Schenectady.
Timerman, L. A., Fort Plain.
Taylor, F. E., Malone.
Van Wie, P. B., Canajoharie.
Waldo, H. D., Schenectady.
Ward, G. E. T., Schenectady.
Wark, J. Finley, Corinth.
White, C. N., Granville.
Whitmyre, R. H., Schenectady.
Wilkinson, W. F., Warrensburgh.
Williamson, W. J., Granville.
Wilson, W. B., Saranac.
Woolsey, Geo., Fonda.
Wright, Frank, Ticonderoga.
Yates, G. H., Fort Edward.

LIFE MEMBERS.

Doolittle, E., Schuylerville.
Rossiter, A. A., Saratoga.
Sigsbee, J. L., Canajoharie.
Sloan, P., Canajoharie.

Fifth District.

THE annual meeting of the Fifth District Dental Society was held April 3, 4, and 5, 1913, at the Onondaga Hotel, Syracuse, and the following persons were elected officers for the ensuing year:

President—T. R. Cullen, Oswego.

Vice-president—J. N. Garlinghouse, Clinton.

Recording Secretary—A. C. Hitzelberger, Utica.

Treasurer—E. R. Webb, Syracuse.

Censors—E. E. Harrington, Watertown; C. E. Cherry, Syracuse, and Sheridan Slocum, Oswego.

State Dental Examiner (term to expire 1916)—A. R. Cooke, Syracuse.

Members of Executive Council—G. B. Beach (regular)—term to expire 1914—and R. B. Redway (alternate), Ilion.

The following were appointed to serve on State Society committees: E. B. Kratzer (Law); I. J. Coe (Legislative); C. S. Fowler and G. H. Butler (Oral Hygiene).

Delegates to the State Society are: I. J. Coe and B. T. Mason, 1913; J. F. Carroll and E. R. White, 1914; R. W. Barry, 1915; C. S. Fowler.

I. J. Coe and B. T. Mason were recommended for permanent membership in the State Society.

Two regular meetings were held during the past year, the semi-annual at Oswego and the annual at Syracuse. Fourteen new members were taken in during the year. The society voted to unite with the State and National societies in the proposed reorganization.

Respectfully submitted,

J. N. GARLINGHOUSE, *Rec. Sec'y.*

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ACTIVE MEMBERS.

Barnes, Chas. H., 912 University Building, Syracuse.
Benz, J. C., 622 Onondaga Co. Bank Building, Syracuse.
Benz, F. W., 622 Onondaga Co. Bank Building, Syracuse.
Barry, R. W., E. Second and Bridge sts., Oswego.
Bickelhaupt, A. C., 315 Kirk Building, Syracuse.
Barrett, J. J., 515 Union Building, Syracuse.
Billington, B. H., 2 Hendricks Building, Syracuse.
Butler, G. H., 715 University Building, Syracuse.
Beach, Geo. B., 518 S. A. & K. Building, Syracuse.
Bradshaw, C. A., 402 S. Salina st., Syracuse.
Barker, W. A., 220 Bastable Building, Syracuse.
Black, H. W., 313 Onondaga Co. Bank Building, Syracuse.
Carroll, J. F., 309 Kirk Building, Syracuse.
Cherry, C. E., 612 University Building, Syracuse.
Cummings, J. E., 513 Onondaga Co. Bank Building, Syracuse.
Cullen, T. R., 2 Wickes Building, Oswego.
Cooke, A. R., 815 University Building, Syracuse.
Coe, I. J., Baldwinsville.
Casler, R. F., Watertown.
Clapp, H. M., Utica.
Craner, C. M., 903 University Building, Syracuse.
Capron, W. B., Utica.
Clifford, W. D., 427 N. Salina st., Syracuse.
Coe, Glen E., Watertown.
Davis, C. H., Jefferson st., Pulaski.
Dower, J. H., 427 University Building, Syracuse.
Denny, F. P., Watertown.
Davis, John L., 304 Dillaye Building, Syracuse.
Engle, W. F., Liverpool.
Eveleigh, E. J., 213 James st., Syracuse.
Faudry, D., Watertown.
Fellows, C. H., Tully.
Fowler, C. S., Watertown.
Fisher, F. W., 419 Union Building, Syracuse.
Gould, L. A., Watertown.
Guillaume, H. F., Utica.
Gowland, W. G., 515 Kirk Building, Syracuse.
Grout, J. J., Skaneateles.
Gilleck, Wm., Clayton.
Garlinghouse, J. N., Clinton.
Head, Geo. T., 314 Dillaye Building, Syracuse.
Hamel, John, 621–622 Kirk Building, Syracuse.
Harrington, E. E., Watertown.
Hall, J. S., 423 University Building, Syracuse.
Heintz, Wm. J., 614 Columbia st., Utica.
Hitzelberger, A. C., 14 Hopper st., Utica.
Jones, W. H., Clinton.
Jones, W. B., 317 Union Building, Syracuse.
Jones, R. Frank, Utica.
Kratzer, E. B., Baldwinsville.
Kelly, J. Otis, Rosenbloom Building, Syracuse.
Leak, W. H., Watertown.
Lafayette, A. M., 725 University Building, Syracuse.
Luther, H. E., Onondaga Co. Bank Building, Syracuse.
Lozott, M. L., 504 N. Salina st., Syracuse.
Mount, M. T., Cato.
Markham, P. H., 219 Bastable Building, Syracuse.
Mills, F. L., 55 W. Genesee st., Baldwinsville.
Mason, B. T., Fulton.
Murry, W. G., Herkimer.
Moyer, W. H., 87 Everson Building, Syracuse.
Neff, E. R., Carthage.
Northrup, Benj. H., State Institute, Syracuse.
Nearing, Geo. E., 513 University Building, Syracuse.
Orchard, H. S., Fulton.
Osgood, A. K., Ilion.
Peters, C. J., 812 University Building, Syracuse.
Parker, G. B., Watertown.
Prichard, J. T., Camden.
Pollard, Glen F., Oriskany Falls.
Potter, Geo., Cape Vincent.
Platner, L. W., Utica.
Perry, G. I., 318 Union Building, Syracuse.
Redway, R. B., Ilion.
Rowland, Chas. E., 313 Onondaga Co. Bank Building, Syracuse.
Roblin, H. M., 604 N. Salina st., Syracuse.
Roth, G. S., 510 Gurney Building, Syracuse.
Retter, A., Utica.
Richards, C. W., Phoenix.
Ryan, C. M., 512 University Building, Syracuse.
Sayers, C. A., 514 Gurney Building, Syracuse.
Stillman, A. A., Union Building, Syracuse.

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Schamu, C. G., 702 University Building, Syracuse.
Stuart, Anna, 117 Seitz Building, Syracuse.
Slocum, Sheridan, Oswego.
Smith, Edbert A., Rome.
Smith, A. F., 514 University Building, Syracuse.
Shotthafer, Edward, Utica.
Slocum, Harold S., Oswego.
Squire, Henry F., 501 S. Salina st., Syracuse.
Sullivan, J. C., Little Falls.
Talley, S. W., 714 Dillaye Building, Syracuse.
Talley, Dyer B., 714 Dillaye Building, Syracuse.
Tremain, W. F., Rome.
Tompkins, H. H., Utica.
Turner, R. C., Oswego.
Webb, E. R., 415 University Building, Syracuse.
Wells, Albert D., Skaneateles.
Wells, I. G., Holland Patent.
White, Edgar R., 718 S. A. & K. Building, Syracuse.
Wright, Geo. L., 202 W. Genesee st., Syracuse.
Wein, Phillip S., 602 N. Salina st., Syracuse.

Sixth District.

THE annual meeting of the Sixth District Dental Society was held March 28 and 29, 1913, and the following persons were elected officers for the ensuing year:

President—B. O. Chapman.
Vice-president—H. H. Turner.
Recording Secretary—J. D. Ogden.
Treasurer—E. L. Pitcher.
Members of Executive Council—J. B. West (regular), Elmira, and C. M. Dunne (alternate), Norwich.

The following were appointed to serve on the State Oral Hygiene Committee: H. D. Whitmarsh, C. M. Dunne, and F. M. Willis.

Delegates to the State Society are: H. E. Fitch, J. D. Kelly, E. L. Pitcher, F. H. Tatlock, H. J. Cull, B. O. Chapman, C. G. Bassett, and G. N. Griswold.

Respectfully submitted,

W. W. BARTON, *Sec'y.*

ACTIVE MEMBERS.

Arbuckle, J. H., Delhi.
Barnes, A. S., Oneonta.
Barton, W. W., Binghamton.
Bassett, C. G., Sidney.
Baylis, C. F., Oneonta.
Bond, J. Ellis, Binghamton.
Burdick, G. A., Homer.
Burghardt, H. D., Whitney Point.
Champlin, F. W., Oneida.
Chapman, B. O., Elmira.
Cowan, J. H., Cortland.
Cox, C. W., Horseheads.
Crawford, J. R., Ithaca.
Cull, H. J., Cazenovia.
Cunningham, H. E., Hobart.
Darby, F. B., Elmira.
Decker, G. M., Owego.
Denike, G. A., Binghamton.
Dolan, B., Binghamton.
Downs, E. D., Owego.
Dunne, C. M., Norwich.
Erwin, J. J., Elmira.
Faulkner, J. V., Oneida.
Fish, M. H., New Berlin.
Fitch, H. E., Elmira.
Ford, F. A., Cazenovia.
Frisbie, J. D., Andes.
Garling, N. L., Ithaca.
Garvin, F. A., Oneida.
Gill, E. S., Morrisville.
Griswold, G. N., Unadilla.
Haase, F., Jr., Elmira.
Hanks, C. S., Oneonta.
Harris, E. W., Walton.
Haskell, H. S., Greene.
Heiss, H. V., Binghamton.
Hill, N. L., Owego.
Howe, F. B., Ithaca.
Howe, J. B., Ithaca.
Ingalls, C. E., Cortland.
Ingalls, L. S., Cortland.
Ivory, J. T., Binghamton.
Johnson, R. A., Bainbridge.
Kelly, J. D., Binghamton.
Knapp, L. E., Deposit.
Le Suer, W. J., Oneonta.

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Mayor, W. E., Owego.
McCall, F. W., Binghamton.
Miller, H. J., New Berlin.
Mitchell, H. B., Elmira.
Moore, H. A., Elmira.
Needham, A. V., Oneida.
Nellis, G. N., Walton.
Nelson, E., Waverly.
Noble, L. E., Endicott.
Ogden, J. D., Binghamton.
Ogden, Wm. A., Binghamton.
Payne, D. B., Sherburne.
Peterson, H. A., Elmira.
Pitcher, E. L., Cooperstown.
Pritchard, E. J., Hancock.
Pritchard, W. H., Newark Valley.
Roe, M. N., Owego.
Root, R. T., Binghamton.
Sharp, W. M., Binghamton.
Smith, F. W., Elmira.
Soden, F. B., Norwich.
St. John, F. C., Walton.
Stuart, T. R., Ithaca.
Tatlock, F. H., Oneonta.
Thompson, C. E., Oxford.
Turner, A. D., Binghamton.
Turner, H. H., Marathon.
Wells, H. P., Hamilton.
West, J. B., Elmira.
Whitmarsh, H. D., Binghamton.
Willis, F. M., Ithaca.
Wilbur, R. A., Elmira.

HONORARY MEMBERS.

Butler, A. J., Cooperstown.
Burchill, J. E., Cortland.
Flaherty, J. V., Chittenango.
Hall, N. H., Binghamton.
Hoysradt, G. W., Ithaca.
Kelley, W. B., Towanda, Pa.
King, H. B., Rye.
McCall, J. O., Buffalo.
Melotte, G. W., Ithaca.
Newell, J. K., Towanda, Pa.
Quintero, J. M., Lyons, France.
Rischell, E. C., Athens, Pa.
Smith, W. W., Montrose, Pa.
Thompson, F. R., Homer.
Watts, Willis E., Lyons, France.

LIFE MEMBERS.

Holmes, A. M., Morrisville.
Jewell, M. D., Richfield Springs.

Seventh District.

THE annual meeting of the Seventh District Dental Society was held April 3, 1913, and the following persons were elected officers for the ensuing year:

President—E. R. Griswold.
Vice-president—G. C. Lowe.
Recording Secretary—C. A. Howland.
Corresponding Secretary—C. J. Fraley.
Treasurer—C. G. Morsheimer.
Member of Executive Council—B. S. Hert (regular), Rochester.

At this session the following resolution was unanimously adopted by the members present: "That each active member shall annually pay to the treasurer the sum of five dollars for membership in the district, state, and national societies."

State Dental Examiner (term to expire 1916)—W. A. White, Phelps.

The following were appointed to serve on State Society committees: A. E. Sager (Law); E. G. Link (Legislative); G. G. Burns and B. W. Palmer (Oral Hygiene).

Delegates to the State Society are: J. Leslie Weller, Jr., and A. D. Becker.

Respectfully submitted,

GEO. C. LOWE, *Rec. Sec'y.*

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ACTIVE MEMBERS.

Avery, R. B., Auburn.
Agnew, F. L., 63 Monroe ave., Rochester.
Allen, D. H., Honeoye Falls.
Bryant, F. E., 308 Jefferson ave., Rochester.
Bachman, C. C., Waterloo.
Barr, W. H., 384 West ave., Rochester.
Becker, A. D., Palmyra.
Beebe, J. H., 913 C. of C. Building, Rochester.
Brininstool, C. L., 1103 Granite Building, Rochester.
Bennett, C. A., 317 Powers' Building, Rochester.
Burkhart, A. P., 52 Genesee st., Auburn.
Burkhart, G. A. P., Auburn.
Buckland, C. F., Corning.
Burns, G. G., 47 Elwood Building, Rochester.
Bliss, T. C., Dalton.
Barrett, W. R., Spencerport.
Belcher, H. L., Seneca Falls.
Carey, J. H., 115 N. Union st., Rochester.
Charles, O. R., Naples.
Clapp, E. A., Livonia.
Clark, B. F., 133 Clinton ave., S., Rochester.
Cameron, J. H., Caledonia.
Crump, I. J., 20 Triangle Building, Rochester.
Dunn, J. E., 426 West ave., Rochester.
Durrant, J. B., Honeoye Falls.
Eckler, H. F., South ave. and Gregory st., Rochester.
Fraley, C. J., Geneseo.
Furner, J. S., Lima.
Gilbert, L. H., 705 E. and B. Bldg., Rochester.
Goble, L. S., 40 Triangle Bldg., Rochester.
Graves, J. W., 32 Triangle Bldg., Rochester.
Griswold, E. R., Dansville.
Gamble, W. D., Wayland.
Hettig, A. F., 227 Cutler Bldg., Rochester.
Hall, A., Hornell.
Hanna, J. N., 291 West ave., Rochester.
Hert, B. S., 713 C. of C. Bldg., Rochester.
Hofheinz, R. H., 818 C. of C. Bldg., Rochester.
Howland, C. A., 901 C. of C. Bldg., Rochester.
Holmes, H. N., Canandaigua.
Horton, C. L., Auburn.
Hulme, M. L., 75 S. Fitzhugh st., Rochester.
Hicks, B. G., E. Bloomfield.
Ivory, F. W., 57 Triangle Bldg., Rochester.
Lewis, E. F., 508 E. and B. Bldg., Rochester.
Line, J. E., 1104 Granite Bldg., Rochester.
Link, E. G., 226 Cutler Bldg., Rochester.
Locke, G. E., Brockport.
Lowe, G. C., 813 C. of C. Bldg., Rochester.
Meaker, S. R., Auburn.
Marvin, G. P., 211 Cutler Bldg., Rochester.
McIntee, J. L., 248 Cutler Bldg., Rochester.
Moll, C. F., 1 East ave., Rochester.
Morsheimer, C. G., 133 Clinton ave., S., Rochester.
Messerschmitt, F., 1023 Granite Bldg., Rochester.
McDermott, T. H., 511 E. and B. Bldg., Rochester.
McNaughton, R. J., Penn Yan.
Meyers, W. A., Auburn.
Newcomb, H. J., E. Rochester.
O'Neil, W. B., West ave., Rochester.
Palmer, B. W., 232 University ave., Rochester.
Parish, W. A., Avon.
Pike, M. H., 921 C. of C. Bldg., Rochester.
Povall, W. H., Mt. Morris.
Proseus, F. W., 270 Monroe ave., Rochester.
Requa, L., 307 Cutler Bldg., Rochester.
Rood, F. M., 700 E. and B. Bldg., Rochester.
Reeves, H. C., Fairport.
Saunders, T. D., Hornell.
Stott, H. B., 433 Mercantile Bldg., Rochester.
Schake, S. M., 711 C. of C. Bldg., Rochester.
Shaddock, F. J., 819 C. of C. Bldg., Rochester.
Sharp, E. T., Victor.
Sager, A. E., 622 Mercantile Bldg., Rochester.
Sanford, J. E., 35 Elwood Bldg., Rochester.
Saunders, B. G., 85 East ave., Rochester.
Schlottman, E. L., 809 C. of C. Bldg., Rochester.
Scott, J. J., 901 C. of C. Bldg., Rochester.
Sibley, F. L., 63 Lake ave., Rochester.
Slorah, G. W., 157 Clinton ave. N., Rochester.
Smith, P. H., 522 Powers Bldg., Rochester.
Smith, W. W., 83 East ave., Rochester.
Siebold, F. C., Auburn.
Showers, G. F., Corning.
Sweet, E. J., Hornell.
Tarrant, F. J., 399 West ave., Rochester.
Thorn, C. A., 622 Clinton ave. N., Rochester.
Tillotson, R. R., Lyons.
Waldron, C. R., 1129 Granite Bldg., Rochester.
White, W. A., Phelps.

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Wilbur, W. C., Corning.
Windell, W. A., 720 E. and B. Bldg., Rochester.
Weller, J. L., Jr., 424 Mercantile Bldg., Rochester.
Wood, Geo. D., Canandaigua.

HONORARY MEMBER.

Jenkins, N. S., Dresden, Germany.

LIFE MEMBERS.

Miller, H. S., 18 Sibley Place, Rochester.
Osgood, A., Bath.
Elmendorf, C., Penn Yan.
La Salle, B. F., 426 Main st. E., Rochester.
Jones, L. C., Wolcott.

Eighth District.

At the regular meeting of the Eighth District Dental Society, held in Buffalo, April 15, 1913, the following officers were elected:

President—Dr. Abram Hoffman, Buffalo.
Vice-president—Dr. Harry F. Tanner, Medina.
Recording Secretary—James L. Clements, Buffalo.
Corresponding Secretary—B. W. Whipple, Olean.
Treasurer—Fred. A. Ballachey, Buffalo.
Librarian—A. F. Isham, Buffalo.
Assistant Librarian—Frank W. Low, Buffalo.
Board of Censors—A. E. Mimmack (1917); L. M. Waugh (1916); W. B. Dickson (1915); H. J. Burkhart (1914); A. E. Preston (1918).

The delegates to the State Society are: W. H. Ellis, G. M. Hughey, and James L. Clements (1913); C. H. Sharp and C. E. Steigerwald (1914); E. Muntz and C. K. Buell (1915); W. M. Backus and D. M. Thompson (1916).

Five meetings were held during the year, three in Buffalo, one in Niagara Falls, and a union meeting with the Seventh District in Rochester.

The society has lost by death during the year, W. Aloon Barrows, Chas. L. Barrows, Dan. R. Howe, and R. A. Chapman.

We have also lost by resignation, A. D. Hequembourg, W. F. Chappelle, E. Lewis, and B. S. Kinsella.

Membership at the beginning of the year was 177; five new members have been added, four died, four resigned, three have dropped, making the present membership 171; with three members now elected, it is 174.

A large amount of work is being done by our librarian, Dr. A. F. Isham, and his assistant, Dr. Frank W. Low.

The society through the activities of Dr. Louis Meisburger and through individual members has rendered dental services to the Buffalo Orphan Asylum during this past year.

Respectfully submitted,

JAMES L. CLEMENTS,
Corresponding Sec'y.

ACTIVE MEMBERS.

Agnew, Thos. R., Medina.
Allen, C. E., Brocton.
Arnold, W. A., 463 Fifth ave., New York City.
Barrows, D. E., Olean.
Backus, W. M., 475 Grant st., Buffalo.
Ballachey, F. A., 450 Elmwood ave., Buffalo.
Bartlett, W. B., Castile.
Bates, O. W., 186 Seneca st., Buffalo.
Beach, J. W., Professional Bldg., Buffalo.
Belcher, H. L., Seneca Falls.
Benson, Stephen S., Belfast.
Beyer, F. A., 559 Main st., Buffalo.
Buell, C. K., Professional Bldg., Buffalo.
Burkhart, H. J., Batavia.
Burley, W. J., Gowanda.
Burns, E. F., 39 Northampton st., Buffalo.
Boughton, W. E., Batavia.

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Butler, C. S., The Frontenac, Buffalo.
Carmichael, D. D., Leroy.
Caulkins, C. R., Perry.
Caulkins, W. R., Perry.
Cavers, W. M., 722 Main st., Buffalo.
Chester, H. M., 51 Park st., Buffalo.
Childs, Lowell, Springville.
Christenson, J. C., 106 Falls st., Niagara Falls.
Clements, J. L., 530 W. Utica st., Buffalo.
Clifford, J. F., 62 Main st., Lockport.
Collins, J. P., 504 Brisbane Bldg., Buffalo.
Coon, W. M., Alfred.
Cramer, J. A., 234 Grant st., Buffalo.
Cursons, Leon V., 331½ Franklin st., Buffalo.
Collins, John F., 5 Wadsworth st., Buffalo.
Dayment, F. L., 450 Elmwood ave., Buffalo.
Decot, F. T., 1190 Lovejoy st., Buffalo.
Dewey, C. E., Batavia.
Dickson, W. B., 443 Genesee st., Buffalo.
Diltz, David A., Warsaw.
Dixon, J. A., 917 Jefferson st., Buffalo.
Doolittle, G. R., Albion.
Downes, C. R., 100 Main st., Lockport.
Draddy, F. A., Batavia.
Duncan, J. C., 6 West ave., Lockport.
Earley, S. J., Olean.
Edgerly, S. E., 743 Fillmore ave., Buffalo.
Ellis, W. H., 397 Delaware ave., Buffalo.
Ellwood, G. T., 55 Parker ave., Buffalo.
Ernsmere, J. B., 308 W. Ferry st., Buffalo.
Eschelman, S., 421 Franklin st., Buffalo.
Eshelman, M. B., 170 Hodge ave., Buffalo.
Evans, F. H., Fredonia.
Fay, M. L., 379 Hudson st., Buffalo.
Flagg, C. E., 158 Anderson Place, Buffalo.
Forbes, R. N., Salamanca.
Fraine, C. E., 270 Hudson st., Buffalo.
Frank, F. L., 718 Elmwood ave., Buffalo.
Frey, George J., 309 D. S. Morgan Bldg., Buffalo.
Garretson, J. L., 481 Elmwood ave., Buffalo.
Garrett, E. S., 527 Main st., Buffalo.
Gemmill, R. A., Lockport.
Graf, E. G., 706 Michigan st., Buffalo.
Greenen, G. J., 221 Hampshire st., Buffalo.
Gregg, M. A., 103 Genesee st., Buffalo.
Grove, W. V., 610 Ellicott Square, Buffalo.
Hammersmith, P. C., 781 Seneca st., Buffalo.
Harper, F. E., North Collins.
Hartman, J. A., Albion.
Havens, F. C., Niagara Falls.
Hicks, J. R., 55 Allen st., Buffalo.
Hicks, T. A., 55 Allen st., Buffalo.
Hill, C. A., 1868 Broadway, Buffalo.
Hill, Frank P., 731 Prospect ave., Buffalo.
Hoffman, A., 529 Franklin st., Buffalo.
House, C. W., Holland.
Hollister, A. H., Fredonia.
Hughey, G. M., 267 W. Utica st., Buffalo.
Huver, H. B., 100 D. S. Morgan Bldg., Buffalo.
Ide, Burt B., Lockport.
Isham, A. F., 85 N. Pearl st., Buffalo.
Jackson, Graham, The Wellesly, Buffalo.
Jones, H. F., 2070 Niagara st., Buffalo.
Jung, A. H., 65 Goodell st., Buffalo.
Jung, E. P., 584 Genesee st., Buffalo.
Kendall, C. A., 316 Pearl st., Buffalo.
Kendall, F. A., 397 Delaware ave., Buffalo.
King, Wm., 2140 Seneca st., Buffalo.
Kitching, H. W., Hamburg.
Larder, W. J., Fredonia.
Leake, W. J., Lockport.
Leigh, F. P., Attica.
Leitze, G. L., 1137 Genesee st., Buffalo.
Leland, Lloyd, 1872 Niagara st., Buffalo.
Lewis, T. G., 587 Main st., Buffalo.
Low, F. W., 62 N. Pearl st., Buffalo.
Lugsden, F. G., 131 Allen st., Buffalo.
Luther, R. E., Batavia.
Lyon, H. B., Dunkirk.
Macdougal, S. E., 530 Brisbane Bldg., Buffalo.
Madden, J. J., 49 Niagara st., Buffalo.
Main, D. T., 345 Niagara st., Buffalo.
Mair, C. R., 1157 Michigan st., Buffalo.
Marshall, W. E., Eden.
Mallory, J. P., 463 W. Ferry st., Buffalo.
Mease, E. G., Dunkirk.
Meisburger, L., 85 N. Pearl st., Buffalo.
McMichael, H. R., 15 Oxford ave., Buffalo.
Mimmack, A. E., 795 Elmwood ave., Buffalo.
McCall, J. O., 488 Franklin st., Buffalo.
McCoy, D. H., 899 Main st., Buffalo.
Middleton, C. O., 36 Young st., Tonawanda.
Montgomery, W. R., 505 Franklin st., Buffalo.
Morgan, G. H., 2 N. Pearl st., Buffalo.
Mouthrop, G. F., 273 W. Ferry st., Buffalo.
Muir, Robert, 21 Main st., Gowanda.
Mulcahy, L. L., Batavia.
Muntz, E., 932 Fillmore ave., Buffalo.
Murray, Robert, 761 Elmwood ave., Buffalo.
Newman, T. E., 546 Tonawanda st., Buffalo.
Noyes, W. P., Olean.
Otis, N. L., East Aurora.

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Parker, R. C., Sycamore and Fillmore aves., Buffalo.
Pankow, C. A., 227 William st., Buffalo.
Packwood, E. S., 1370 Main st., Buffalo.
Panzica, Joseph E., 161 Court st., Buffalo.
Poole, P. A., 14 S. Division st., Buffalo.
Prentice, W. H., Warsaw.
Preston, A. E., Delevan.
Pringle, G. W., Niagara Falls.
Pullen, H. A., Professional Bldg., Buffalo.
Prefert, Albert, 795 Genesee st., Buffalo.
Read, E. M., Perry.
Reynolds, H. E., 577 Broadway, Buffalo.
Richardson, C. G., Batavia.
Richardson, E. M., Batavia.
Roberts, J. G., 174 E. Ferry st., Buffalo.
Robinson, L. W., 129 Elmwood ave., Buffalo.
Ruszaj, S. E., 1012 Broadway, Buffalo.
Ryerse, Oscar G., 727 Seneca st., Buffalo.
Schnitzpahn, E. E., 18 St. Johns Place, Buffalo.
Sharp, C. H., 28 Main st., Lockport.
Sherwood, J. A., 283 Bryant street, Buffalo.
Shirlock, C. E., Lockport.
Snow, G. B., 71 Goodrich st., Buffalo.
Skinner, O. M., 968 Ridge road, Lackawanna.
Skinner, G. W., Blasdell.
Skinner, George, Lackawanna.
Sortore, J. F., Belmont.
Squire, D. H., 488 Franklin st., Buffalo.
Squire, H. F., Lancaster.
Squires, L. A., 2337 Main st., Buffalo.
Stackhouse, J. A., 143 Elmwood ave., Buffalo.
Steigerwald, C. E., 519 William st., Buffalo.
Stiker, A. G., Addison.
Storms, C. L., 153 E. Utica st., Buffalo.
Strong, E. S., 603 Genesee st., Buffalo.
Sweeney, John, Olean.
Simmons, C. H., Medina.
Tanner, H. F., Medina.
Tench, H. M., 1353 Jefferson st., Buffalo.
Thomas, C. H., Silver Springs.
Thompson, D. M., Niagara Falls.
Todd, E. L., Dunkirk.
Tillotson, C. R., 308 W. Ferry st., Buffalo.
Underwood, F. H., 1063 Ellicott st., Buffalo.
Walsh, L. T., Dunkirk.
Walsh, M. P., Youngstown.
Wardner, J. F., Lackawanna.
Warner, F. W., Angelica.
Washburn, F. M., Perry.
Waters, A. H., 617 Main, st., Buffalo.
Waugh, L. M., 605 Franklin st., Buffalo.
Weaver, F. C., 6 West ave., Lockport.
Whipple, B. W., 301 Union st., Olean.
Whipple, E. C., 301 Union st., Olean.
Whipple, H. L., Cuba.
Wiles, L. E., Fillmore.
Woodley, F. E., 123 Falls st., Niagara Falls
Wright, R. G., 36 W. Huron st., Buffalo.
Young, D. H., Attica.
Zahm, D. F., 428 Broadway, Buffalo.

Ninth District.

THE annual meeting of the Ninth District Dental Society of the State of New York was held April 11, 1913, and the following persons were elected officers for the ensuing year:

President—C. H. Thompson.
Vice-president—H. C. Bennett.
Recording Secretary—J. T. Hepworth.
Corresponding Secretary—H. S. De Witt.
Treasurer—Robert Morrow.
Librarian—W. V. Randall.
Member of Executive Council—Stephen Palmer (regular), Poughkeepsie.

The following were appointed to act on State Society committees: A. W. Twiggar, Ossining (law); H. C. McBrair, Middletown (legislative); G. A. Hammond, Port Jervis, and H. L. Barnum, Newburgh (oral hygiene).

The delegates to the State Society are: Robert Morrow and P. R. Ashplant for two years; H. C. Bennett and G. A. Northrup for three years; A. W. Twiggar and J. T. Hepworth for four years; H. S. DeWitt and C. H. Thompson for one year.

During the year there have been held by the society four regular and one special meetings. Twelve active members have been taken into the society, making a total of 55 active and one honorary member.

Respectfully submitted,

ROBERT MORROW,
Recording Sec'y.

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ACTIVE MEMBERS.

Anderson, A. E., Peekskill.
Ashplant, P. R., Newburgh.
Ball, Bertram, Yonkers.
Bannan, P. C., Newburgh.
Barnum, H. L., Newburgh.
Bauder, P., Newburgh.
Bedell, Walter H., Poughkeepsie.
Bennett, H. C., Newburgh.
Berthoff, H. W., Yonkers.
Birdsall, C. C., Central Valley.
Cole, J. P., Dobbs Ferry.
Conover, C. A., Newburgh.
Cowles, E., Fishkill-on-Hudson.
DeWitt, H. S., Middletown.
Downing, V. F., Poughkeepsie.
Dunning, W. O., Middletown.
Duryee, E. C., Peekskill.
Ehleider, T. J., Poughkeepsie.
Ermann, F. P., Warwick.
Fancher, W. M., Ossining.
Foote, P. L., Poughkeepsie.
Gurnee, C. D., Fishkill-on-Hudson.
Hammond, Grace, Fishkill-on-Hudson.
Hammond, G. A., Port Jervis.
Helms, L. W., Peekskill.
Hepworth, J. T., Wappingers Falls.
Johnson, J. H., Port Jervis.
Kidd, W., Newburgh.
McBrair, H. C., Middletown.
McLean, David W., Mount Vernon.
Meikle, C., Walden.
Mills, J. J., Port Jervis.
Morrow, Robert, Nyack.
Northrup, G. A., Poughkeepsie.
Palmer, Stephen, Poughkeepsie.
Parker, E. G., Goshen.
Patterson, J. E., Poughkeepsie.
Phin, Albert E., Peekskill.
Randall, W. V., Newburgh.
Ryder, H. L. B., Poughkeepsie.
Smith, Frederick, Newburgh.
Stanbrough, W. M., Newburgh.
Southerland, J. R., Monroe.
Suffern, E. R., Suffern.
Sweezy, F. W., Port Jervis.
Teller, W. S., Newburgh.
Thompson, C. H., Goshen.
Traver, W. E., Red Hook.
Turner, C. G., Poughkeepsie.
Twiggar, A. W., Ossining.
Varcoe, E. R., Goshen.
Vernon, G. H., Middletown.
Walch, J., Newburgh.
Writer, G. S., Nyack.
Wygant, C. P., Peekskill.

HONORARY MEMBER.

Hutchinson, R. G., Jr., New York City.

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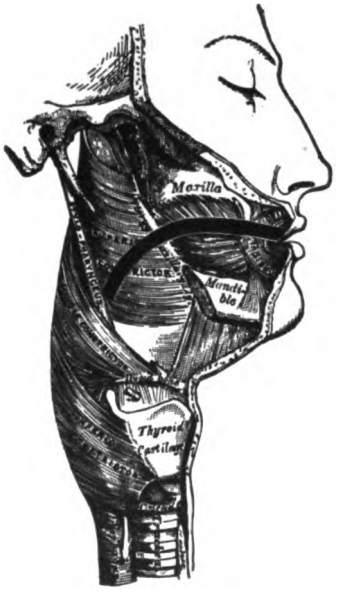
REPORT OF THE CLINICS.

CLEFT-PALATE PLATE. (By Dr. MORTON VAN LOAN, Albany.)

After several years of experience in trying to make a cleft-palate plate to restore the functions lost by a condition of congenital double cleft palate and double hare-lip, the clinician came to

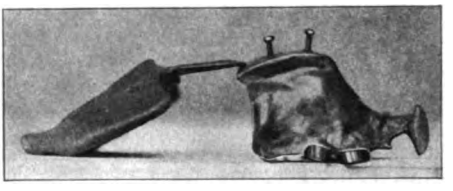
FIG. 1.



the conclusion that there had been nothing yet made which was entirely satisfactory. Those who have studied the action of the throat know that during the act of swallowing the back of the throat rises and comes forward, and the whole muscular cavity more or less contracts. (See Fig. 1.) Therefore anything put in the back of the throat to fulfil the lost functions of the soft palate must be of a flexible nature.

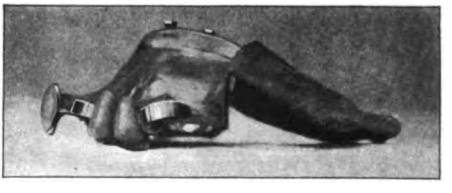
All the cleft-palate pieces which have been made in the past have been made

FIG. 2.



with a motion which causes them to rise, but not to fall. It was the clinician's opinion, before attempting to make the practical apparatus exhibited, that this was not sufficient, but that we must have a piece which would both rise and fall.

FIG. 3.



He started to work to make such a piece, making first a solid gold plate to restore the hard palate, which is a simple matter, and which has been done by hundreds of men before. He then attached to that gold plate, by means of two gold screw posts, a tongue of gold (Fig. 2) fitting in the slot of the gold plate caused by the form of the cleft,

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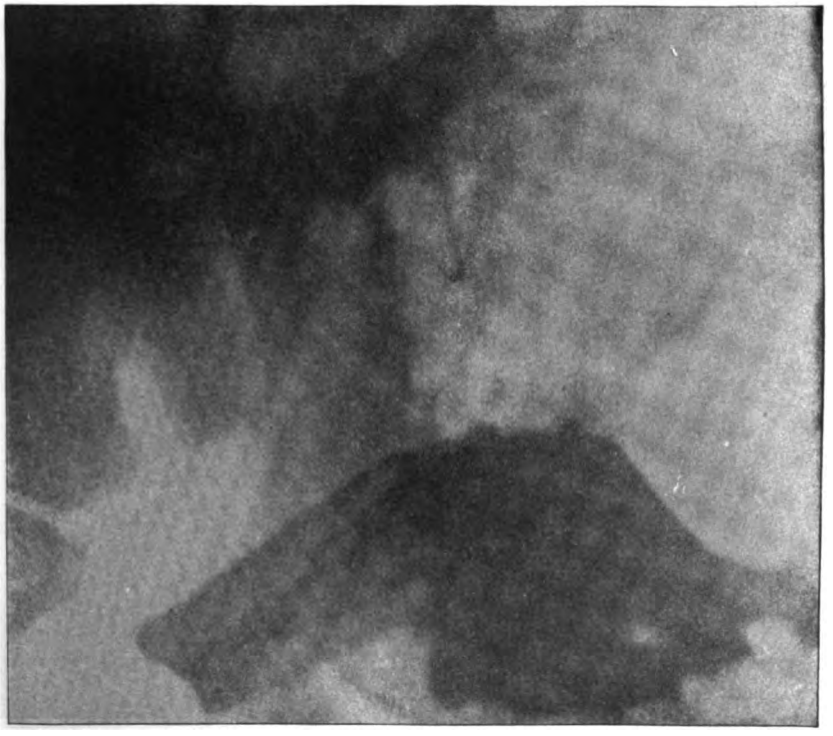
the heads of the screw posts projecting into the nasal cavity, where they do no harm and cause no inconvenience. This gold tongue and the soft piece are shown in Fig. 3.

The soft piece is made of palate rubber; we have the dies, and new pieces can be vulcanized and attached to the gold tongue without any inconvenience to the patient. We have also two of the gold tongues with the soft attachment, so that they can be changed frequently, or sterilized from time to time, and in that way they last longer than if we had but the one piece.

This soft piece was made by inserting the tongue of gold in its proper place on the gold plate, and then molding the unvulcanized rubber into shape as nearly as possible, placing it upon the tongue and putting in the mouth, and trying to place it so that the patient could talk and retain the appliance without its gagging him or touching the back of his throat. The thick part of the soft piece was made of two thicknesses of palate rubber; before vucanizing, and after vulcanizing, it was found that it worked perfectly.

The plate with this attachment was placed in the mouth of the patient, giving perfectly satisfactory results. (Fig. 4.) The patient had already had some twenty-odd plates of different kinds made by different dentists in the United States, the most successful of which was made by Dr. Gritman of the University of Pennsylvania. This was

FIG. 4.



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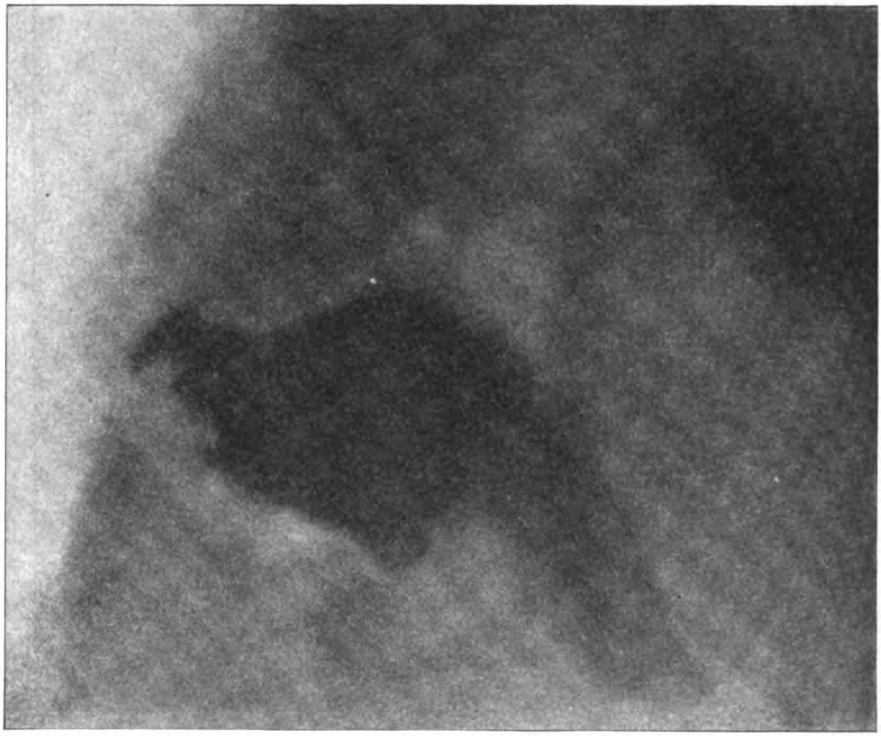
a rubber plate extending as far back as the soft palate, but in the region of the soft palate it was made thick and in the shape of a large collar button, extending into the posterior nares, and around which each division of the soft palate was supposed to contract, and in this way close the opening to the posterior nares. tus in his mouth, the clinician had some X-ray pictures taken, to verify his supposition. The first picture shows the patient with the apparatus in his mouth, at rest (Fig. 4); the second was an instantaneous exposure taken of the patient with the apparatus in his mouth in the act of swallowing, and, as is seen,

FIG. 5.



These plates have been made by a number of different dentists and have been described in the dental literature. It was the clinician's opinion that such a plate must have a soft piece, movable both backward and upward to close the posterior nares, and must respond to the contraction of the pharynx, therefore possess a downward and forward movement. After the patient had this apparathe clinician's supposition that, in the act of swallowing, the soft part of the palate goes forward and downward, is absolutely correct (Fig. 5). With this particular piece, in the act of swallowing, when there is solid food in the mouth, the bolus of the food forces the soft rubber upward into the posterior nares, closing these off, so that the food does not force itself into the posterior

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nares. That it is also not necessary that we close that passage entirely in the act of talking is evidenced by the fact that this patient can talk perfectly well, even if the appliance does not absolutely close the posterior nares, that particular portion being made so as to leave a space of about a quarter of an inch between the posterior wall of the pharynx and the end of the soft palate.

In this particular instance, the patient had been operated upon for double hare-lip, and in the clinician's opinion the operation had not been properly performed, for the lip was drawn down tightly against the anterior teeth. He therefore took the patient to Dr. E. A. VanderVeer of Albany, who again operated on the hare-lip, with the result of relieving the drawn condition and giving to the lips more mobility, also producing a marked improvement in the speech of the patient.

THE ARTIFICIAL RESTORATION OF LOST OR MISSING TISSUES IN CONGENITAL CLEFT PALATE. (By Dr. VETHAKE E. MITCHELL, New York City.)

The value of a method by which this class of oral defects are corrected is judged by the result obtained, and the clinician's object in presenting this patient was to show by actual demonstration the possibilities in the improvement of voice and speech by means of an artificial substitute for the missing tissues, and the advantage of such a procedure over surgical operations.

There are two reasons for attempting to correct this defect—(1) improvement in health by permitting the passage of air and food through their proper channels, and (2) the improvement in voice and speech by restoring to the vocal mechanism its missing tissues and their functions.

The palate is one of the most important organs of voice and speech. Its functions are concerned in the forming of the tone of the voice by regulating the size and shape of the resonance chambers, and to close off the nasal passages in the emission of certain sounds.

The vomer bone, that portion of the nasal septum which is, more or less, missing in all these cases, is also a very important part of the vocal mechanism especially concerned in nasal resonance.

Without any question, surgical closure of the cleft would be the ideal method of treatment, if it were possible to restore all the tissues and their functions, but such is seldom the case.

Appliances of many shapes and of different materials have been devised for the closure of the cleft, but with apparently little regard for the restoration of the nasal passages to permit of normal respiration, or the restoration of the resonance chambers for the improvement of voice and speech. In the appliance presented all these features or functions have been taken into consideration.

The first six months of the unfortunate child's life is a very critical period, owing to its inability to receive nourishment.

Some twelve years ago, the clinician devised an appliance which will materially assist them. It consists of a soft-rubber plate covering the roof of the mouth closing the cleft, to which is attached the rubber nipple, either for bottle or breast feeding. (A specimen of this appliance was passed around.)

The clinician then introduced a patient, Miss K., for whom he had made an appliance last June. He passed around the model of the patient's mouth to give some idea of the defective condition of her vocal mechanism. The

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width of the cleft at the posterior border of the hard palate was 13/16ths of an inch, and the vomer bone was entirely absent, contra-indicating surgical operation.

The appliance is constructed of hard rubber and gold, making it thoroughly hygienic, durable, and non-irritating to the tissues. The plate covers the roof of the mouth, and is firmly clasped to the teeth. The hard palate and vomer bone are reproduced in hard rubber, vulcanized to the plate; the soft palate, also of hard rubber, is fastened by a hinge so shaped as to be controlled by the muscular action of the palatal tissue.

Without the aid of her appliance, the patient was asked to pronounce some of the most difficult letters of the alphabet: First, the labials—B, P, F, V; then, the anterior linguo-palatals—C, D, S, T; then the posterior linguo-palatals—G, K, Q, and X, Y, Z.

Then an awkward combination, as "sixty-six," and a still more difficult combination, the name of Dr. Norman W. Kingsley.

With the appliance in the mouth, the patient then repeated this combination, demonstrating a very marked change in the quality of her voice, articulation, and enunciation.

To show that, when the palate is raised by the muscles, the nasal passages are closed and that the breath may be forcibly expelled through the mouth, the patient was asked to blow out a candle. This may seem a very simple matter, but the patient was not able to do this before the introduction of this appliance.

Most appliances that are constructed at the present time are bulbous, or of the plug type, which necessarily interferes with nasal resonance, the appliance more or less filling up these resonance cavities. To show how absolutely important it is to have the nasal passages restored to as nearly as possible a normal condition, the clinician added a piece of wax to each side of the artificial vomer bone, completely closing off the nasal passages, showing the interference of nasal resonance.

The patient then pronounced NEE, NAH, NOH, and ING, N, and M, with and without the obstruction.

To show what is possible with the singing voice, the patient gave a singing demonstration, assisted by her vocal teacher:

(1) Through the development of her breath control, and by a unique card-buzzing exercise, to develop certain phases of the voice, the patient was enabled to blow a steady flow of breath through the lips. To show her breath control, she demonstrated a little exercise in card-buzzing.

(2) Next, the scales of thirteen vowels and thirteen consonants were used. These scales have been arranged so discriminatively in their sequence in vocal art-science that, by their correct use, each and every resonator from the tip of the nose to the epiglottis is exercised, and finally all are correlated or coupled. With the use of the scale of consonants and vowels, all muscles for articulation and enunciation, namely, the lips, tongue, and palate, are exercised and developed, and perfect pronunciation is the result. The patient demonstrated the above combination; to show her breath control and tone quality, she sustained the thirteen vowels at three or four different pitches. Then, to show her use of the scale of thirteen consonants and vowels, she sang them on chromatic scales, and reversed the order of syllables on descending scales.

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(3) To demonstrate the practical use of the mechanical appliance, and to show the foremost and highest nasal resonance, the patient sustained the combination of ING, N, M, and prolonged the sound of M to show its position in the singing quality.

(4) To demonstrate the perfect mechanical action of the appliance, the patient sang an arpeggio that moved from a lower to a higher pitch in the ascension. This necessitated a rise and fall of the normal palate, and was perfectly apparent with the artificial palate.

(5) The patient finished her demonstration by singing two short ballads, "Since You Loved Me," by Sanderson, and "A Bowl of Roses," by Coningsby. This was done to show the combination of articulation, enunciation, pronunciation, and also the legato in singing. The latter necessitates perfect breath reistance against the upper incisors, which again, is made possible by the mechanical appliance.

In the training of her singing voice and perfecting of her articulation and enunciation, this patient has had only twenty-six lessons thus far.

AN X-RAY PHOTOGRAPH SHOWING AN IMPACTED LOWER SECOND BICUSPID, THE DECIDUOUS MOLARS BEING STILL RETAINED IN THE ARCH, AND ALSO IMPACTED, IN A PATIENT OF THIRTY YEARS. (Dr. F. E. BRYANT, Rochester.)

A HOME-MADE INSTRUMENT FOR CARVING WAX MODELS IN CAST INLAY WORK. (Dr. BERNARD FISCHLER, Brooklyn.)

TECHNIQUE OF MAKING JACKSON APPLIANCES OF GOLD AND PLATINUM. (Dr. C. W. B. WHEELER, New York.)

ORTHODONTIA. (Dr. G. A. FLETCHER, Albany.)

This clinic consisted in a demonstration of the application of the new Angle orthodontia appliances, shown by plaster models of practical cases fitted with the appliances. The advantages of wire solder, with drawplates, and instruments for cutting and forming the desired size and shape were also exhibited.

EXHIBITION OF TRANSPLANTATION OF LOWER INCISORS. (Dr. G. N. APPLETON, Albany.)

REPAIR OF FRACTURED INCISOR. (Dr. H. G. KITTELL, Upper Troy.)

A youth about twelve years of age presented himself with a broken upper central incisor. The fracture was clean, extending from the gum line on the labial surface to about one-sixteenth of an inch below the alveolar border on the palatal surface, this slight portion of the alveolus, being still fastened to the broken crown, acting as a hinge, and the tooth dropping back of the lower incisors.

The pulp when first seen was dead. The broken crown was removed and preserved in an antiseptic solution, the root-canal treated, and at a later sitting filled. An iridio-platinum dowel was fitted into the root-canal, allowing about three-sixteenths of an inch to protrude. This protruding portion was fitted into the enlarged pulp chamber of the broken crown, and the whole cemented to place. After three and one-half years' service, the tooth looks as good as it did originally, the color remaining as good, if not better, than that of the average devitalized tooth.

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GOLD INLAY FILLING IN COMBINATION WITH SYNTHETIC CEMENT. (Dr. W. A. WARREN, Watervliet.)

The method of procedure demonstrated is as follows: The cavity is prepared in the usual manner as for any inlay; a wax impression is taken, preferably with Taggart's wax, in the usual manner; when completed, the surface exposed to view is carved out with a small, sharp lancet, or, if air-pressure is used, the cavity may be drilled with an inverted-cone bur. The cavity must be retentive to hold synthetic cement. The next step consists in casting and cementing the inlay in the cavity and finishing it; then synthetic cement of the desired shade is inserted.

IMMEDIATE CUTTING AND GRINDING OF SENSITIVE DENTIN, WITH THE AID OF CHLORO-CARBOLIN OBTUNDENT. (Dr S. G. WALLACE, Lakewood, N. J.)

The patient, a man of about forty-five years of age, a dentist by profession, of nervo-bilious temperament, overworked and in a highly nervous condition, was much in dread of dental operations, as his teeth were acutely sensitive. At the clinician's request two of the dentists attending the clinic selected a highly sensitive cavity located at the gingival margin on the distal surface of a lower left second bicuspid, approximating a gold crown on the first molar. The difficulty of this operation was increased by the fact that the cavity did not extend to the occlusal surface of the bicuspid. Furthermore, because of the close contact with the gold crown and the lack of a right-angle attachment, the operator was obliged to use a No. 7 handpiece, to make an opening from the occlusal surface by cutting down the enamel and dentin to the center of the bicuspid and into the cavity.

Method of desensitizing. A small quantity of the obtundent was placed in a receptacle; then a pledget of cotton was saturated in the obtundent, placed around and in the cavity, and allowed to remain about five minutes. With a finely cut No. 3 round bur, an opening was made from the distal surface to the center of the bicuspid; then, with a fine cross-cut dentate fissure bur, lateral excavation was made down to the floor of the cavity, after the manner of the Black method of cavity preparation. The burs were continually dipped in the liquid and kept wet with the obtundent while in motion. After a careful examination by dentists attending the clinic, the tooth was found to be thoroughly desensitized, and the patient stated that during the entire operation he had felt no pain or sensitiveness. The time required for desensitizing the tooth and completing the cavity preparation did not exceed twenty minutes.

CROWNING TEETH WITH PORCELAIN. (Dr. FRANK W. KETNER, Hudson.)

The method of procedure described is as follows: First, the root is beveled as for a Logan crown, then a disk of platinum, No. 29 gage, is made so as to fit perfectly the root to be crowned. The canal is enlarged sufficiently to accommodate the dowel of the Logan crown, a crown suitable for the case is selected, and the front and back are ground away until the center of the crown fits closely around the dowel at the end of the root; the disk is waxed into position, the crown and disk are removed and invested. When ready to go into the furnace, the front and back are filled-in with porcelain and fused. The porcelain crown is put gradually into the fur-

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nace, so as to heat the crown before the pin, to prevent fracture. If it is desired to band the root, this should be done first in the usual manner with platinum, using platinum solder; then the operator may proceed in the manner described.

NITROUS OXID. (Dr. H. E. TOMPKINS, New York.)

Dr. Tompkins' clinic consisted in several tests for the purity of nitrous oxid, as follows:

First test. A rough test for purity above 95 per cent. consists in applying a pressure gage to the cylinder, turning on the gas, and noting the pressure. If the pressure is above 790 pounds to the square inch, the gas is condemned as impure.

Second test. The gas is passed through Nessler's reagent to show the presence of ammonia, which gives to the testing solution a light yellow color or throws down a red-brown precipitate.

Third test. The gas is passed through a solution of potassium permanganate to show the presence of nitrites. If nitrites are present, the solution is deoxidized or decolorized.

Fourth test. The gas is passed through a solution of iron sulfate to show nitrites and nitrates. If these are present, the solution turns brown.

THE USE OF ALYPIN AS A LOCAL ANESTHETIC IN EXTRACTIONS. (Dr. A. G. LANSING, New York.)

A 2 per cent. solution of alypin made up in a boric acid solution will keep for months. This preparation has no toxic effects—is harmless as pure water, and, if injected freely into the gums about the roots of the teeth, will produce an anesthetic effect which is perfect, and which will last from five to ten minutes. The advantage of alypin over most other anesthetics is that it contains no cocain and is not a secret formula, the formula being printed on the label. It does not produce sloughing of the gums nor depression of the heart. The clinician has used this preparation for six years, with uniformly perfect success.

MENDELISM AND ITS BEARING ON SOME DENTAL PROBLEMS. (Dr. F. L. STANTON, New York.)

The principles of Mendelism were shown by means of charts and illustrations of Mendel's original experiment on *pisum sativum*. Several histories of families were shown in which the upper lateral incisors were missing. Models of mouths were shown to illustrate the fact that the presence of the extra cusp on the lingual surface of the second deciduous upper molars foreshadowed the presence of this cusp in the first permanent upper molars. The clinician suggested that the absence of laterals and this extra cusp might be due to discontinuous variation, and subject to the laws of Mendelian inheritance. Histories of similar cases were solicited by the clinician, in order that the key to inheritance might further be investigated.

MAKING GLASS BURNISHERS. (By Dr. CHAS. K. BUELL, Buffalo.)

Glass burnishers, for burnishing matrices for porcelain inlays, also for burnishing silicate cements, are made by heating glass rods, three-sixteenths of an inch in diameter and twelve inches long, in the center, and drawing them apart, leaving a tapering end upon each piece. The tip end is broken off with pliers and

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reheated to form a ball, the size of which will depend upon the length of time it is left in the flame. While hot, this end may be bent to any desired angle.

A Quickly Made and Antiseptic Temporary Filling. (Dr. Arthur H. Merritt, New York.)

Commercial zinc oxid, when mixed to a stiff paste with oil of cloves, will make a temporary filling which in large cavities in protected places will last for several months, and when carefully employed will effectually seal any treatment in a tooth, including arsenic. If the filling is exposed to direct pressure, the patient should be seen within a few days, as much of the filling will have been worn out through mastication. Its sedative qualities make this material an excellent temporary filling for use in sensitive teeth. Its use will make unnecessary the unsanitary cotton dressings dipped in sandarac, too often seen in the mouths of patients at the present time.

The cavity to which it is applied need not be dry, but simply wiped out with cotton. As a temporary filling for all-around purposes the clinician knows of nothing so satisfactory, as it combines sedative and antiseptic qualities with cleanness and ease of removal.

A Convenient Form of Rubber-dam Clamp. (By Dr. W. B. Dunning, New York.)

A modified rubber clamp was demonstrated, consisting of blunted jaws which, being protected by a thin layer of hot modeling compound, may be adapted to the tooth-neck. This insures a perfect fit about the tooth, hence an even distribution of pressure from the clamp spring, and when the compound has hardened, the appliance will be found to be very rigid. The chief advantage of this device is the fact that it never slips, and the patient is thereby protected from painful impingement upon the gum tissue. This clamp is first applied to the tooth, then the dam, having a large hole, is stretched over it and down into place. The jaws may be conveniently blunted by placing a common clamp on a stick of the size of a lead pencil, then adapting to each jaw, above and below its edge, bits of German silver wire, about 19 gage, bent like little hairpins—one for each jaw—and adapted to the surface of the stick. A touch of soft solder securely holds them in place. The clamp is then spread, the interior surfaces are smeared with hot compound in the way in which sealing-wax is applied, and when this has slightly cooled, the clamp is carried to the tooth and adapted to its place.

Excision and Drainage of Dentigerous Cysts. (By Dr. H. S. Dunning, New York.)

The patient was a young Swede, eighteen years of age, with a large dentigerous cyst in the upper right jaw.

The permanent canine had never erupted, and there was quite a space between the lateral and first bicuspid. The upper jaw was anesthetized with novocain solution containing adrenalin chlorid, and the patient was given one-sixth grain of morphin.

The incision, one and one-half inches long, was made over the alveolar ridge, extending from the lateral incisor to the first molar region. The mucous membrane and periosteum were dissected back from the bone, and the body of the maxilla exposed. With bone-chisel and mallet, the external surface of the superior maxillary bone was chiseled away,

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and was found to be very soft and thin. A large cavity was exposed after a couple of strokes of the mallet, and a gush of thick, foul pus followed. Pus and blood were sponged away, and more of the thin bone forming the cyst cavity was removed with Rongeur forceps. The cavity was irrigated and sponged out, and it was then found that the entire maxillary sinus was obliterated, and that there was one large cavity extending from the region of the lateral incisor to the second molar, upward to the floor of the nose and the floor of the orbit. The unerupted canine was easily found and removed, also a deciduous canine. The distinct lining membrane of the cyst was found and removed, and the cavity gently curetted. The apices of the two bicuspids and of the lateral and central incisors were exposed, as they projected into the cyst cavity. The cavity was then packed with gauze saturated with bismuth paste.

CASTING OF ALUMINUM PLATES BY THE VACUUM PROCESS. (By Dr. J. PENSAK, Brooklyn.)

After obtaining a perfect impression, all relief work is done. The material used in making the model should not be scraped, because the proper smoothness cannot be obtained if the model is tampered with. The compound used in making the model should be any one of the high-grade materials on the market. The clinician used Brophy's Imperial investment compound. After the model is properly made, the exact outline for the plate is marked with a soft lead pencil, and the plate is waxed up in accordance with this pencil mark. A light-colored wax should be used, for the lighter it is the less impurities there are, and therefore the less chance of failure. The wax base-plate is fastened to the model at all points thoroughly. If there is an opening, the investment material will get under the base-plate, and a failure will result. A rim is then made on the labial, buccal, condylar, and lingual sides of the ridge by cutting a strip of wax to $\frac{1}{8}$ inch, and fastening it down on the base-plate so that it forms one continuous strip. The operator must be sure that deep undercuts are formed for the retention of the rubber, also lugs or spurs should be made on the ridge between the inner and outer rims, to help retain the rubber.

The flask for investing is the one made by the Ransom & Randolph Co., who also make the Elgin vacuum casting machine, which was used at the clinic. A wooden sprue block is part of the outfit. This block should be completely covered with a thin layer of wax, except on its flat base. Short strips of wax about $\frac{1}{2}$ inch long and $\frac{1}{4}$ inch wide are cut to represent the gates through which the aluminum will flow. There should be at least four of these strips—the clinician always uses five. It is better to have more of lesser width than few of greater width, because the metal may flow by gravity if the openings are large enough, and failure will result. These strips of wax are attached to the base-plate at its condylar and palatal ends, and to the sprue block within the depression at its narrow end. Care should be taken not to make the combined length of the model, wax gates, and sprue block longer than the length of the flask.

The case is then invested, the model and sprue block are placed into water, and a camel's-hair brush is kept in readiness. The investment material —which may be the same as that used

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for the model—is then mixed to the consistence of cream, and the flask is poured about three-quarters full. With the brush the investment material is painted into all crevices, until the whole of the base-plate wax is covered thoroughly. The case is pressed gently into the flask with a pumping motion to displace any air-bubbles. After the investment hardens, any superfluous material is trimmed off, making the rim of the base of the flask fully clear. The case is then heated in clean boiling water, until the sprue block comes out easily. The flask is tested on the bed of the casting machine to see if there is perfect suction. The flask is moved around and around, until there is good suction; then, with chalk, the exact position of the projecting knob of the flask is marked, so as not to have trouble when replacing the flask while it is red-hot. Lack of suction is the cause of most failures. To keep the bed of the machine and the bottom of the flask from corroding, both are oiled with liquid albolin before and after using.

Now the flask is heated, very slowly at first, raising the flame gradually. When all the wax is burned out, the flask is covered with a funnel until it is red-hot. At this point the melting of the aluminum is begun, the flame not to be directed on the aluminum itself, because this will affect its usefulness. The machine is placed in readiness and pumped up to about 25 or 30 inches. Just when the metal is beginning to melt, the flask is placed in its proper position on the bed of the machine. A quick test is made to see that all is right. The crucible holding the melted aluminum is grasped firmly, and the metal poured on to the flask. Just when all the gates are covered, the valve of the machine is opened. The flask and machine are let stand quietly until cool.

Aside from the above description of the casting of aluminum plates, the clinician exhibited artistic aluminum dentures without rubber attachment. The method of making these is as follows:

After the models are properly placed on the articulator, and the shade, length, and width of the teeth secured, properly fitting, diatoric teeth are selected for the bicuspids and molars, and Goslee teeth for the six anterior teeth. Six base-metal pins are placed in proper position to receive the Goslee teeth. On the record card the mold and manufacture of the diatoric teeth to be used are entered. The countersunk part of these diatorics is oiled and pressed into the softened wax. All necessary grinding is done, until the articulation is correct. When all teeth are in proper position, they are removed. It is essential to keep a record of the mold and make, for future reference. By this procedure anteriorly six posts for the Goslee teeth, and posteriorly eight projections for the diatoric teeth have been obtained. In finishing, the same process is used as described above. This plate is not only beautiful, but the teeth are interchangeable, which is a great advantage.

SOME FAILURES IN CASTING ALUMINUM. (By Dr. J. PENSAK, Brooklyn.)

(1) *Leakage.* This may be due to (*a*) leaky valves of the casting machine, (*b*) imperfect contact between the base of the flask and the bed of the casting machine. The latter may be caused by too much investment material at the bottom of the flask or by corrosion of the metal either of the base of the flask or of the bed of the casting machine.

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(2) *Holes in the plate.* This may be due (*a*) to dirt or residue in the mold, left by impure wax, (*b*) to the flask not being hot enough when casting, or (*c*) to the flask being heated too suddenly and chips of the investment getting into the mold.

(3) *Non-fitting plate.* This may be due (*a*) to faulty impression, (*b*) to permitting investing material to get under the wax base-plate while investing, (*c*) to handling the flask before it is cool enough, thereby disturbing the metal before it has set thoroughly, or (*d*) to checks in the investment, caused by investing too long before casting.

(4) *Imperfect casting.* This may be due (*a*) to opening the suction valve before the molten metal has covered all the open gates, (*b*) to opening the valve after the molten metal has commenced to congeal, and (*c*) to the gate openings being too large, and metal being drawn down by gravity before suction commences.

(5) *Satisfaction in wear.* The highest grade of aluminum must be used. The clinician has had success for nearly three years with Aerdentalloy (that is, aluminum about 86 per cent., silver 14 per cent.) made by the Ransom & Randolph Co.

DEMONSTRATING THE USE OF A HIGH FREQUENCY CURRENT IN THE TREATMENT OF PYORRHEA ALVEOLARIS AND ALL CONGESTED CONDITIONS OF THE ORAL CAVITY. (By Dr. MOORE STEVENS, Atlantic City, N. J.)

"A high-frequency current is an alternating—oscillating—current in which the frequency is beyond the point of producing muscular contraction." High-frequency currents possess therapeutic power in passing through tissue the vitality of which has almost been exhausted through the encroachment of disease.

The application of the current was made by way of special vacuum electrodes directly upon the diseased tissue.

In pyorrhea we generally have a deposit of calcium around the necks of the teeth, swollen gums full of venous blood, and loose peridental tissue. In the advanced stages we have a deposit of pus in the pockets.

The deposits and inflammation must necessarily be first removed. The swollen gums must be reduced to normal condition by forcing the venous blood into the circulation. This can be done by stimulation of the parts, through the application of the high-frequency current and the special vacuum electrode, as shown at this clinic, directly on the diseased area. The current appears to promote circulation, increase metabolism, and more or less completely restore general harmony to the parts.

The clinician was not in a position to say much about driving medicaments into the tissues with the high-frequency current, but hopes to be able to make more definite statements in this respect later on.

With the proper application of this current, relief from pain can be given in the eruption of teeth, tic douloureux, gangrene, sensitive teeth during menstruation, neuralgia, ulcerated gums—in fact, in any congested condition of the oral cavity.

X-RAY MEASUREMENT OF THE UNERUPTED PERMANENT TEETH AT THE AGE OF FIVE OR SIX YEARS TO PROVIDE FOR EARLY REGULATION OF THE ARCH, IF REQUIRED. (By SINCLAIR TOUSEY, A.M., M.D., New York.)

Measurements of the deciduous teeth and of the permanent teeth some years

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(I)

DECIDUOUS AND PERMANENT CENTRAL INCISORS:

Actual width. (*Permanent incisors measured some years later.*)

(In 100ths of an inch.)

NAME.	Years of age—1st measurement	Years of age—2d measurement	Weight in lbs. at 2d measurement	Right upper central—deciduous	Right upper central—permanent	Ratio 1 to	Left lower central—deciduous	Left lower central—permanent	Ratio 1 to
			(lb.)						
Matthew Sweeney .	6	8	. .	25	38	1.52	15	24½	1.63
Clara Tucksmith . .	5	10	85	24	36	1.50	15½	22	1.42
Cecelia Leonard . .	7	9	. .	21	33	1.30	. .	21	. .
Gretchen Winter . .	5	10	73	25	29	1.16	14	19	1.36
Margaret Frutchy .	5	10	72	25½	33	1.25	16½	21	1.28
Florence Fox	5	10	63	25	34	1.36	14	21	1.50
Sissie Reilly	5	10	60	23	36	1.57	11	23	2.09
Jeanette Stevens . .	6	8	. .	22½	31	1.38	.	. .	. .
Nora Ferguson . . .	6	6	. .	. .	35	. .	. .	. .	. .

This table shows that no reliable inference may be drawn from actual measurements of the deciduous teeth as to the size of the oncoming permanent teeth.

(II)

PERMANENT CENTRAL INCISORS:

Measured radiographically before eruption, and actually, some years later, after eruption.

(In 100ths of an inch.)

NAME.	Tooth (central)	Radiograph (uncrupted)	Actual (after eruption)
Matthew Sweeney . .	Lt. up.	39	38½
Clara Tucksmith . .	Rt. up.	36	36
" " . .	Rt. low.	22	22
Cecelia Leonard . .	Rt. up.	34 oblique	33
Gretchen Winter .	Rt. up.	29	29
Florence Fox . . .	Rt. up.	35	34
Sissie Reilly	Lt. up.	36	36
Jeanette Stevens . .	Lt. up.	32	32
" " . .	Rt. low.	21½	22

This table shows that the X ray gives reliable information as to the size of the unerupted permanent teeth.

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later show no fixed or even approximate ratio between the two. Some of the smallest deciduous teeth are succeeded by the largest permanent teeth. (See Tables I and II.)

Models of the dental arch in these children at the age of five or six, and again five years later, show that the radius of curvature formed by the deciduous teeth is reproduced by the permanent teeth, whether it be large enough for the latter or not. Consequently a child with small deciduous teeth arranged in a beautifully regular curve may later show a set of large permanent teeth hideously deformed and impeded in eruption, because crowded into the original small curve. The interference with the eruption of the permanent teeth not only results in dental deformity, but impairs the development of the jaw, the nasal passages, the pneumatic sinuses of the face, and even the base of the skull. The great majority of operations upon the nasal septum and for adenoids and hypertrophied tonsils result directly from this cause.

By means of the X ray, the unerupted permanent teeth have been measured, and the measurements have been verified by the actual measurements some years later.

From these measurements of the unerupted permanent teeth, the curve required to accommodate them is calculated and drawn for the guidance of the orthodontist. It is an easy matter to regulate the deciduous teeth to this curve, and this will surely guide the permanent teeth into proper position as they erupt.

TREATING PYORRHEA BY THE AID OF ETHYL BORATE GAS. (By Dr. W. F. DUNLOP, New York, N. Y.)

The ethyl borate gas is generated, while being used, in a machine which the clinician demonstrated. This machine consists of an outside tank, six inches in diameter, fourteen inches high, with a top and bottom. Inserted in the top is another tank two inches in diameter and five and one-quarter inches long, with the bottom concave to the extent of one-quarter inch. The two tanks are connected by a tube, the ethyl borate antiseptic being poured into a cup with a screw cap on. The cup is continuous, with a small tube extending to the bottom of the smaller tank. The large cylinder or tank is filled with this special gas. When the gas is turned on to be used, it passes through a reducing valve, and the gages on each tank show just what pressure is being applied. When the machine is charged right and working properly, the antiseptic will be volatilized, and come through a hypodermic needle perfectly dry. With a tube, four feet long, moisture is produced which, if applied to the teeth and loose gums, will leave a heavy precipitate well up under the gums.

This is a very mild but powerful antiseptic. The inflamed gums will take the oxygen out of the precipitate, and circulation is restored. This can be seen working; the blue color of the congested tissues disappears, leaving them pink.

After a treatment of this kind, stains and all deposits must be removed from the teeth, without planing the roots; the teeth are polished and the necks tapped and sprayed again; then, if there remain any deep pockets, a "pocket-packer" is warmed and a small piece of it applied against the teeth with the finger. The material is pressed until it fills the space between the teeth, and protects the gingival margin from the saliva. The patients are given a box of this packer, and instructed in its use; they are to have also some ethyl borate

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antiseptic, to use as a mouth-wash. The mouth must be clean, and all crevices and pockets packed before retiring. This seems to be a pleasure, as the mouth feels comfortable. The whole treatment is painless.

The treatment differs, after the mouth has been made clean, and all pockets look healthy. The machine is charged with forty pounds of gas; the whole mouth is sprayed, and the gingival margins of the gums all around the teeth are gone over with the needle. The gingiva is full of little ducts which lead up into the deeper layers. The gas will find an entrance through these ducts, and will follow them in all directions if there is any inflammation left. It must be remembered, however, that these little capillaries are very weak on account of the broken-down tissues and poor circulation, and when the stagnant blood is oxygenated, the whole condition changes and the tissues commence to be rebuilt; therefore they should be just stimulated and fed at first by one little jet of the gas. When the gas enters the tissues, they rob the gas of its oxygen and leave the solids in the tissues. This causes stimulation, and great quantities of blood are attracted to the parts; the blue color disappears and a beautiful pink results. The circulation stimulates cell growth, and a reproduction of the parts is the outcome, as long as the cell-containing membranes are left intact.

ORTHODONTIA AND ORTHOPEDIA OF THE FACE. (By Dr. V. H. JACKSON, New York.)

Dr. Jackson presented forty models and appliances, illustrating his method of designing and making removable regulating appliances which are readily removed by the patient for the cleansing of the teeth and the apparatus, and showing how the apparatus can easily be arranged for the correction of any form of irregularity of the teeth. The clinician described first his method of anchoring appliances to the teeth by spring clasp attachments, and then his new method of anchoring appliances to the teeth by a locking device.

With the locking device the appliance is anchored to a canine or bicuspid and to a distal molar, on each side of the arch.

The locking device or anchorage portion of the appliance consists first in cementing a collar with a buccal lug to each of the anchorage teeth, the lug being of triangular shape, like a door-latch. To the mesio- and disto-lingual portions of the appliance is attached a wire clasp, shaped so as to pass over the arch at the junction of two of the teeth, and to rest above the buccal lug of the collar on each of the anchorage teeth described. The end of the clasp always terminates in a loop, similar to a small hook, so that, in unlocking the device, one's finger will not be pricked or injured in springing outward the end of the wire clasp; the hooks on the clasps are necessary for holding the rubber equalizing bands.

This anchorage is suitable for supporting the appliance for the treatment of any form of irregularity of the teeth, being especially suited for the equalizing of the upper and lower dental arches in correcting prognathous conditions of the mandible, or for protrusion of the upper arch, rotation of any of the teeth, retention of the teeth, their movement in the process by the use of "equalizing posts," etc.

The apparatus is adapted for treatment of patients of any age.

With the collection were shown mod-

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els of the upper and lower dental arches of a child four years of age, before and after regulating. The child had upper protrusion and very narrow arches. With the models were shown a record card and an upper and lower appliance used for correcting the irregularity by the expansion of the dental arches, and the arches were equalized by the use of rubber equalizing bands.

The clinician demonstrated the tracing and record system that he introduced to insure the operator's making a definite measurement of each change made in the apparatus in applying a given amount of force and a definite amount of movement, thus preventing any discomfort to the patient, each change in the apparatus being controlled by measurement, or a step recorded on the record card. Dr. Jackson pointed out that the use of the record card in the manner described makes orthodontia an exact science.

(I) A Method of Obtaining a Perfectly Fitting Gold Crown from the Dental Laboratory. (II) A Cast Crown with Steele Facing to Replace the Richmond Crown in Fixed Bridge Work. (By Dr. D. W. McLean, Mount Vernon, N. Y.)

First the tooth is "prepared," which can seldom be done without devitalizing the pulp. The most simple and expeditious method of removing the pulp is the following: Nitrous oxid and oxygen are administered, and the patient is placed in the analgesic state. The pulp is then exposed with a sharp bur; only the slightest suggestion of pain will be felt. The tooth is then isolated by means of an aseptic doily, and a half-tablet of cocain and adrenalin is applied to the pulp. A piece of cotton slightly moistened with sterile water is then placed over the cocain tablet, vulcanite rubber or yellow wax is placed over this, and strong pressure applied. In the analgesic state there will be no pain, and one strong pressure will be enough. The pulp is then removed, and the canals are reamed. This will consume about ten minutes.

The tooth is now shaped with diamond disks and stones, so that there is a definite taper toward the occlusal surface. Enough should be removed from the occlusal surface to accommodate a crown reinforced not only in the cusps, but also in the fissures, where the stress of the proper occlusion will largely fall.

A dentimeter measurement is now taken, and a narrow platinum band made and soldered. This is trimmed to conform to the contour of the gingival gum margin, and is carefully fitted and burnished to the tooth. The band is then placed in position on the tooth, and a careful bite and plaster impression are taken. The cast is poured, leaving the band in position on the plaster tooth.

The casts are then articulated and sent to the mechanic, who is instructed to make the crown so that it will extend half-way up the platinum band and occlude properly in that position. The crown is then contoured to the band, a piece of solder laid on that joint, and heated with the blowpipe. This soldering is done right on the cast. The finished crown will slip into place without any further grinding or fitting.

(II) The root-canal is reamed, and the root prepared somewhat as for a Logan or other porcelain crown. The enamel is removed with a suitable scaler, from the mesial, distal, and lingual sur-

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faces of the root, and the edges are beveled. With an Ottolengui reamer, the root is faced at a slight incline toward the lingual surface, but not to a point below the gum margin. From the root-canal forward to the facial edge it should be given a more decided slant, to a point *near,* but not *at* or *beyond* the edge of the peridental membrane.

A Steele facing, either anterior or posterior as the case may require, is then ground to a good joint at the cervical margin, facially, and a gold backing applied and fitted to the facing. A piece of inlay wax, heated, is then applied to the back of the facing and tapered with the fingers to a point, which is pressed into the root-canal, and the facing is pressed into position. It is then removed, and the excess wax trimmed away; it is then placed in the root again, and the edges of the wax are burnished to the tooth, mesially, distally, and lingually, to form a band-like edge.

If the crown is now in its proper position, it is removed once more, slightly softened in warm water, and again pressed into place in the tooth, adjusting it carefully to its proper place.

The crown is then removed from the tooth, the facing is removed, and the casting is made in the usual way. This gives a very strong crown with post, base, and backing cast in one piece, and the post fitting the root perfectly. Coin clasp or twenty-two karat gold is preferred for this work.

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President's Addresss.

By C. F. BAYLIS, D.D.S., Oneonta.

WE are again assembled to attend the annual meeting of our society, the forty-fifth anniversary of the organization. I trust it is well that another year has passed and we can again meet the friends we have learned by close association to esteem and respect. Our surroundings are most delightful as we are privileged for the first time to hold our meetings in this beautiful building, devoted exclusively to educational purposes. It is an experiment, holding our meetings in one place and having the clinics and exhibits at our hotel headquarters. I trust it will be profitable to all concerned.

As your presiding officer, I extend a cordial welcome to all, and I trust that you will have a pleasant and profitable time, and return to your several localities with a feeling that you are better prepared to serve your patients, and yourselves, for having been with us.

This society and its allied district societies for the past forty-five years have succeeded in making our profession a representative one in this state. It is now looked upon by the members of other professions, and by people generally, as an educated, skilled, respectable, and progressive profession, of which any man may well feel proud to be a member.

To every ethical practitioner of our profession in this state I wish to say that he owes a great debt of gratitude to the men who have been the pioneers in building up these societies, and our profession, and I invite you to come with us and give us your co-operation and support, that we may not only be a leading society, but a progressive one, with every representative ethical member of the profession with us, all moving forward for the good of the society, the profession, and the public to whom we strive to give health and happiness.

REORGANIZATION.

The adoption this morning of new By-laws makes this meeting a marking-stone in our onward and upward progress as a society. The old order of conditions has passed away, and we enter the future under a new and progressive form of government and an unlimited membership.

We have reorganized—or, as I term it, we have moved forward from the small to a large dental society. This reorganization makes no change in the management of the district societies, except that their active members become members of the State Society and of the National Dental Association, and that

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they must collect dues from their members sufficient to enable the district society to pay the dues of the State Society, and that the State Society is to pay the dues of the National Dental Association. The district societies at their annual meeting are to elect a representative on the Executive Council and an alternate, a member of the Law Committee, a member of the Legislative Committee, two members of the Oral Hygiene Committee, and are to recommend two members for appointment on the State Board of Dental Examiners.

For a number of years the business of the society, except election of officers, has been transacted by the Executive Council. Under our new by-laws, they also elect the officers of the society, thus placing us entirely under a "commission" form of government. All sessions of the Council are open to members of the society, and any member may be heard on any subject under consideration.

DISTRICT SOCIETIES.

It has been my privilege to be the guest of the several district societies, except the Second and Ninth, which I regret not being able to visit because I had no definite knowledge of the dates of their meetings.

My visits to the several sections of the state convinced me that there is a deep feeling among the members of the several societies for the welfare of the organization and its members, and that good-fellowship and harmony permeate the local organizations. The evident progressiveness seemed more along the lines mentioned than that of increasing the membership. I would recommend that we do a little missionary work, and go out and induce our ethical brother practitioners to come with us. Let us try to make them see that to do so would be for their good, for the good of the local society, for the good of the State Society, and above all for the good of the profession. Every ethical dentist should feel that the societies are entitled to his moral and financial support, in return for what they have done for his profession.

The presidents of the several district societies are endeavoring to create a closer relationship with the various sections of the state, and to this end they have arranged a dinner for the retiring and active presidents of the several societies, at six o'clock, May 8th.

SCIENTIFIC RESEARCH.

The Scientific Research Committee have been very fortunate in having Prof. Wm. J. Gies, of the department of biological chemistry, Columbia University, to continue the direction of their investigations. With the splendid facilities of Columbia University back of him, he is able to go about his work with the best equipment available to science at the present time. Many of the stock preparations and appliances have been supplied by the university without cost to the committee. Professor Gies has not accepted personal remuneration, and the money appropriated has been expended in employing associates of Professor Gies who are willing to devote their time in carrying out the experiments under his direction.

I would recommend that the society appropriate at least three hundred dollars for the use of the Scientific Research Commitee for the coming year.

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STATE LIBRARY.

I am informed that the State Library does not contain any books on dentistry. I recommend that the Dental Society of the State of New York appoint a committee of three to select a list of dental books for the State Librarian to have purchased and placed in said State Library, at Albany, N. Y.

INTERNATIONAL CONGRESS.

The Fourth International Congress of School Hygiene will convene at Buffalo, N. Y., August 25 to 30, 1913. This congress is one of the most important conventions ever held in this country from the standpoint of public health. Our society has been very active in inducing the Public Health Commission of this state to introduce Oral Hygiene in our public schools. It seems a most opportune time for this society to be represented at such a congress, and I recommend that the Oral Hygiene Committee take steps toward affiliation with this congress.

HONORARY MEMBER.

It gives me great pleasure to recommend the election of Wm. J. Gies, M.D., Ph.D., as an honorary member of this society. Dr. Gies for the past several years has been doing a great amount of scientific investigation inquiring into all the possible factors in the causation of dental caries, and I believe his investigations toward the solution of this great problem are of concrete and substantial value to the society. He has been nominated by Wm. B. Dunning, seconded by Ellison Hillyer, Arthur H. Merritt, L. M. Waugh, and other members of the society.

THE PROGRAM.

The Business Committee have succeeded in securing for us some excellent papers by prominent men in the profession, from without as well as within our state; and prominent members of the medical profession have consented to read and discuss papers and also to give clinics. With the very complete reports that the several committees have prepared on timely subjects, I feel confident that very interesting and profitable sessions await you.

CLINICS.

The Committee on Clinics have been a very hard-working and efficient committee. They have succeeded in securing a very large and excellent list of clinicians for the two sessions assigned to this section of our meeting, and I trust their efforts will be rewarded by a large attendance.

CONCLUSION.

In conclusion, I wish to state that the hearty co-operation tendered me by the members throughout the state has been very gratifying, and that every request made by me of a member of this society has been cheerfully granted.

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The Development of the Anatomical Articulator.

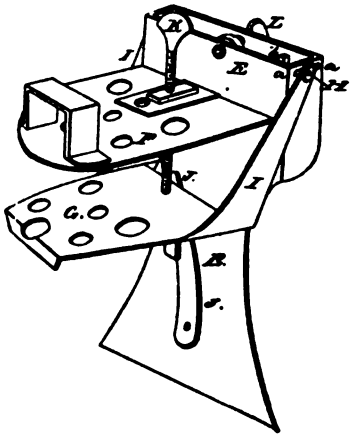
By ELLISON HILLYER, D.D.S., Sc.D., Brooklyn.

AUTHORITIES upon icthyology tell us that certain fish in seeking a coveted fresh-water pool will travel many miles up a salt-water stream, never deviating or erring in their instinctive certainty of final success. There are many deep and sparkling pools of wisdom lying far "up stream" in the pathway of dental investigation, which must be carefully and unceasingly sought in our efforts to obtain definite and tangible conclusions.

These definite conclusions have been laboriously and painstakingly sought by many men for the past half-century; the exertions of these pioneers to date are but beginning to bear fruit in the results of our dental operations. When we consider the progress of our profession for this half-century period—particularly the last two decades—we are stirred with admiration at many of the results thus far achieved. Progress has been steadily advancing toward the betterment of every procedure. Many of the men who have been the greatest factors in this advancement are among that vast "majority"—who, let us hope, are still watching over our professional welfare and by their inspiration are inciting to greater efforts those who are today carrying on the good work.

Among the many problems which have confronted the profession, one of the most difficult has been that of the anatomical arrangement of teeth. This has been due to the fact that the early conceptions of the mandibular movements were either exceedingly limited,

FIG. 1.



or, if those movements were comparatively well understood, but little effort to reproduce them was exerted.

It seems like the irony of fate that at the time when the least was done to correctly reproduce natural relations of the teeth there was a greater percentage of edentulous cases than at this

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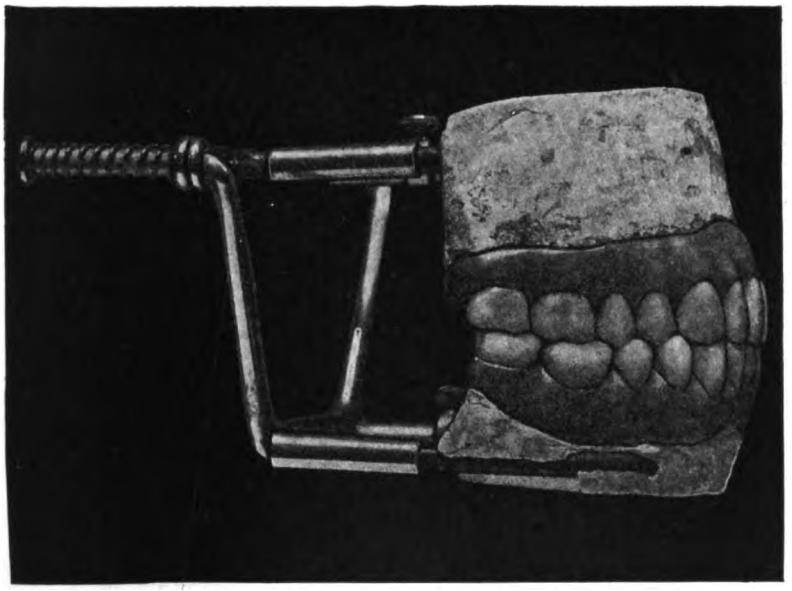
time, when so much is being done to bring about a solution. The conservation of tooth structure, the preservation of roots, restoration by means of casting methods, the treatment of pyorrhea, and noble efforts in the field of oral prophylaxis, are tending to gradually eliminate the edentulous condition. While, however, gradually diminishing, yet that

ing many evidences of attempts to record the mandibular movements, evidently met with little appreciation, as only the Patent-office records give proof of its having existed. Dr. Bonwill's investigations in the early fifties covered a wide area, and led him to conclusions which were based upon the four-inch equilateral triangle. This measurement

FIG. 2.



Bonwill articulator. (From collection in Univ. Pa. Dental Dep't.)

condition will be, like the poor, always with us, and must receive the best possible consideration.

THE EARLIEST ARTICULATORS—THOSE OF EVANS AND BONWILL.

Dr. Bonwill deservedly bears the reputation of being the pioneer in this field, and his articulator is still in use by some practitioners. His work is antedated by that of Dr. D. T. Evans (Fig. 1), who in 1840 was granted a patent upon an articulator which, while showfrom the temporo-mandibular articulations to the symphysis was proved to exist in a large number of skulls examined, with such slight variation that it was made the basis for the construction of an articulator admitting of the placement of the models in the relation of the four-inch position (Fig. 2). The great fault in this articulator, however, lay in the fact that but two of the many movements of the mandible could be reproduced, viz, the lateral and the protrusive. Neither had Dr. Bonwill any

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certain means of transfer of the wax articulation from the mouth to the articulator.

Fig. 3.

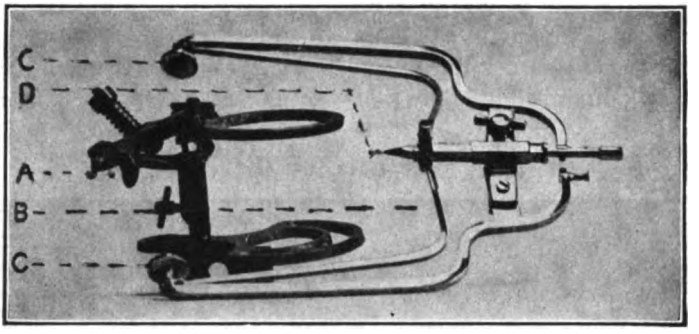
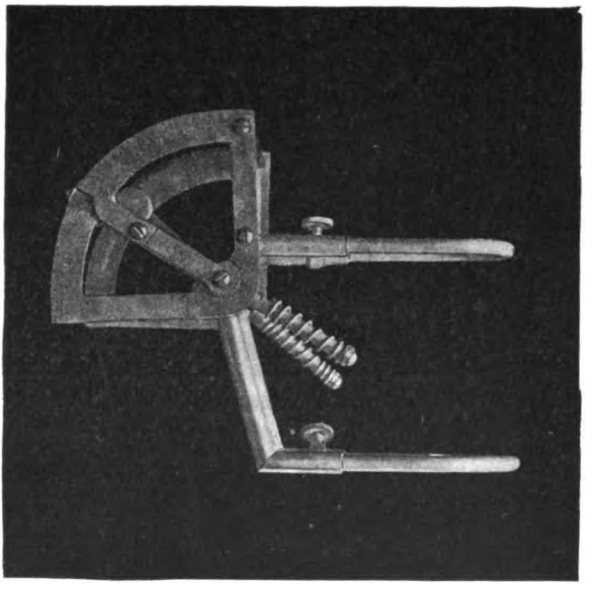


Fig. 4.



Walker's articulator.

HAYES' ARTICULATOR AND ARTICULATING CALIPER.

This need was evidently impressed upon Dr. R. S. Hayes, who devised an articulator (Fig. 3) and a transfer apparatus which he termed an "articulating caliper." This resembles somewhat the "Snow face-bow" with which we are all familiar, in that it permitted the measurement of a given case, but it afforded no fixed transfer as does the Snow apparatus. Dr. Hayes also made an improvement in the manner of recording the condyle movement by providing a downward incline, which was the same upon both sides—a condition

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which in nature seldom, if ever, exists.

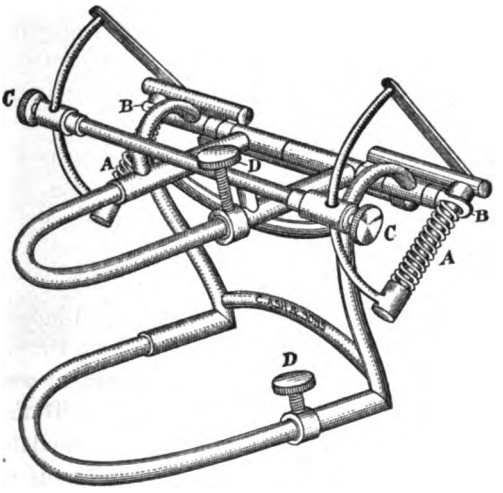
WALKER'S "FACIAL CLINOMETER."

It is most interesting to follow the trend of development as evidenced in the investigations of Dr. W. E. Walker in the measurements and angles of rotation, was not of such a nature as to appeal to the average practitioner.

CHRISTENSEN'S ARTICULATOR.

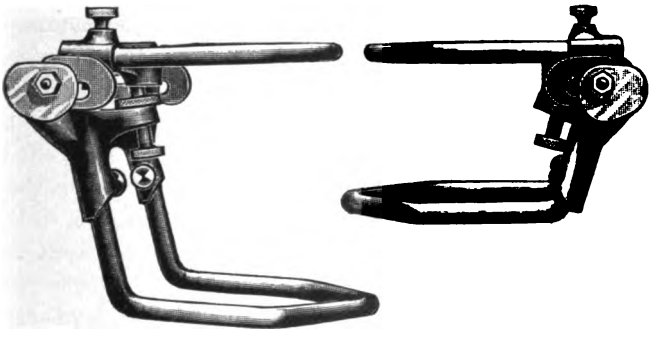
Dr. Carl Christensen of Copenhagen followed this line of investigation, and

FIG. 5.



Christensen's articulator.

FIG. 6.



Gritman's articulator.

the early nineties. The fault in Dr. Hayes' articulator was eliminated by providing attachments to record the path of the condyle independently upon each side (Fig. 4). Dr. Walker's "facial clinometer," with which he computed by means of soft wax placed between the prepared bite waxes at the posterior region recorded the protrusive movement of the mandible. Like Dr. Walker's articulator, that of Dr. Christensen (Fig. 5) admitted of independ-

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FIG. 7.

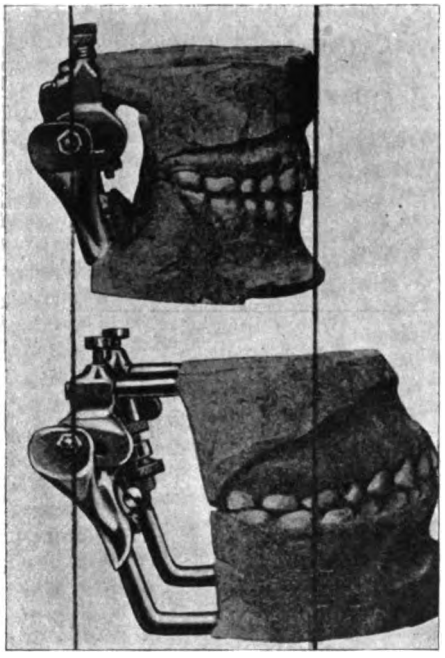

FIG. 8.

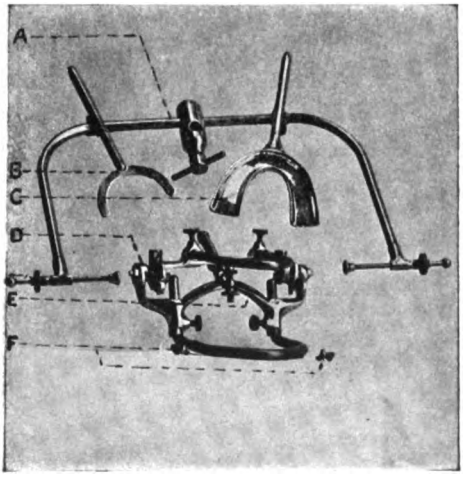

FIG. 9.

ent record of the condyle movement, but had no means of accurate transfer from the mouth to the articulator.

THE KERR ARTICULATOR.

The Kerr articulator contained a further development in that it provided for the record on each side of independent movement, by a condyle path permitting of a fixation at a desired angle; like its predecessors, however, it lacked means of mechanical transfer of the waxes.

Upon this point of transfer really rested the crux of the greater part of the difficulty.

GRITMAN'S ARTICULATOR.

This was thoroughly impressed upon the minds of Dr. Geo. B. Snow and Dr. A. D. Gritman, who collaborated at the University of Buffalo, Dr. Gritman producing an articulator which provided, by lateral extensions upon the condyle portion of the frame, for the attachment of the "face-bow" devised by Dr. Snow. Dr. Gritman's articulator (Fig. 6) had many advantages not possessed by previous ones. The lower adjustable bow, constructed with an upright arm attachment, made it possible to adapt large or small models with equal ease. (Fig. 7.) The condyle paths were almost horizontal, having a very slight oblique slope, the same on both sides—fixed and immovable. This was corrected, in the subsequent articulator presented by Dr. Snow (Fig. 8), by paths movable and adjustable to a given position recorded by means of the "bite gages" (Fig. 9).

SNOW'S "FACE-BOW" AND "BITE-GAGES."

It is not my purpose in this paper to enter into the details of the preliminary steps of the preparation of bite waxes,

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FIG. 10.

Face-bow in position. Prothero attachment on face-bow to assist in proper adjustment. Bites in mouth, with T-piece projecting through swivel clamp on face-bow.

FIG. 11.

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nor of the arrangement of teeth made possible by the use of the anatomical articulator. It is wise, however, to note the essential points of difference which referred to prior to Drs. Snow and Gritman, little had been done in this direction. Dr. Snow, in giving to the profession the "face-bow," bestowed an

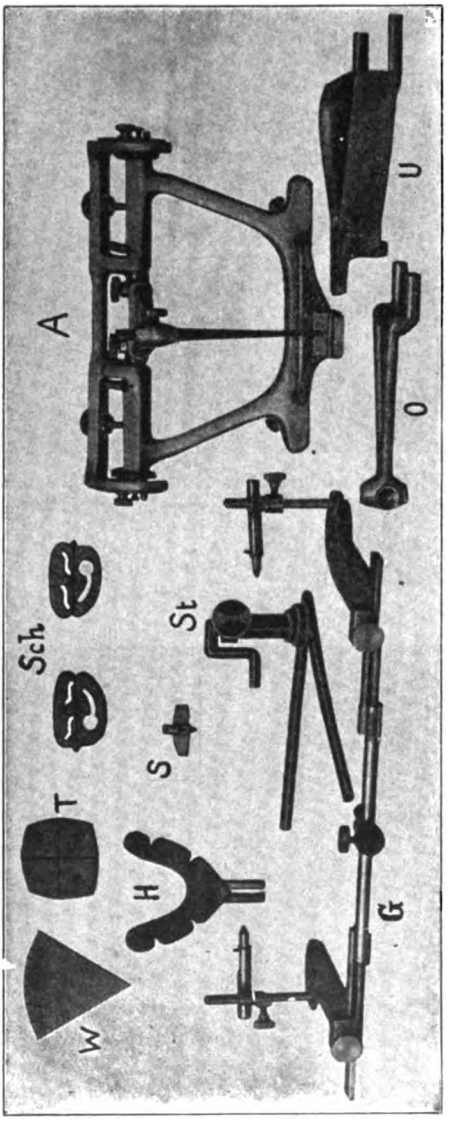

FIG. 12.

A, Articulator. O, U, Extra bows. G, Condyle path register. H, Horse-shoe plate. Sch, Extra pair of condyle path guides. W, Angle measure for condyle path slant. T, Type plate for molar groove. St, Holder for register G (to be used when plastering models to articulator).

have developed regarding the transfer of the bite waxes from the mouth to the articulator. Except for the somewhat indefinite methods used by those already inestimable benefit, and I sincerely hope that we may be able to show to Dr. Snow, while he is yet active, how much we appreciate what he has done. The

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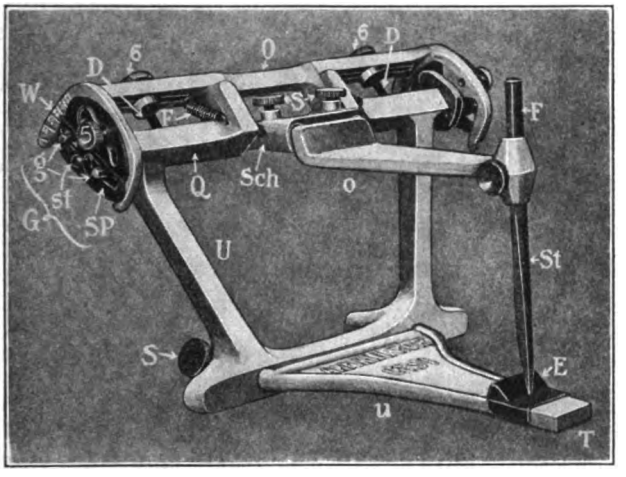
special virtue in the face-bow lies in its certainty of position due to the fixation of the various parts (Fig. 10). When the bite waxes have been fully developed as to adaptation of trial bases, fulness of contour, lip lines, etc., and the upper and lower waxes united, the fork is placed in the waxes with the bar portion extending in a line parallel with the base of the facial angle (Fig. 11). The face-bow is then adjusted to the bar by means of the bite-waxes. Care should be used to adjust them upon the articulator in such a position that the fork shall be parallel with the bench upon which rests the lower bow of the articulator. The models being secured by the plaster, the waxes, upper and lower, should be separated, reintroduced into the mouth, and, with the bite gages inserted at the posterior surface of the lower wax surface, the patient should protrude the

FIG. 13.



of the clamp, and the adjustable condyle rods placed in apposition with the previously marked temporo-mandibular articulations. The graded marks upon the condyle rods make it possible to adjust the bow equidistant upon each side, thus recording and fixing the condition thought out many years previously by Dr. Bonwill. With the clasp screw set the condyle rods may be loosened and the waxes withdrawn from the mouth. The rods are then placed as far as possible within the bow and set. In this position they fit snugly upon the projections intended for them. The models are then adjusted to position by means mandible, allowing the projection on the upper surface of the bite gage to mark the position of the protrusion. The waxes are then replaced upon the articulator, and the set-screws securing the condyle paths released, as also the extension bar at the back. When the models have been approximated by the waxes with the bite gages in position, the inclination of movement on each side is recorded and set by means of the set-screws on each side. The extension spring bar is again hooked into position, the bite gages are removed, and the operator is ready to proceed with the certainty that the individual positions

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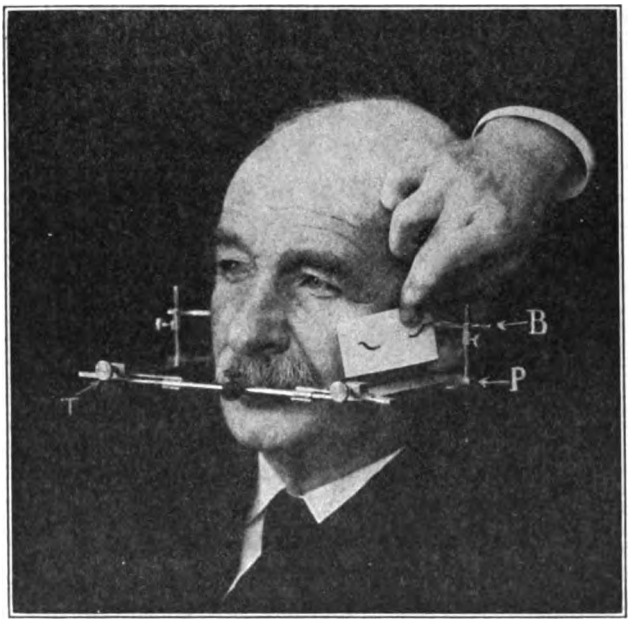
of the case have been correctly recorded upon the articulator, and that, if all subsequent operations be carefully carried forward, results will be relatively certain.

GYSI'S WORK ON THE PROBLEM OF ARTICULATION.

With the exception of Dr. Christensen, all the investigators I have mentioned have carried on their work in this country. There have been many others, however, on the other side of the Atlantic who have used their best endeavors to perfect apparatus to accomplish the desired end. Among these are Dr. Bennett of London, Dr. Breuer of Vienna, and Dr. Gysi of Zurich. The investigations of Dr. Gysi, published in the *Dental Cosmos* in its issues for January, February, March, and April, 1910, created a profound impression. The articulator which he devised (Figs. 12 and 13) seemed exceedingly complicated upon its first introduction, but, like many another apparatus, when understood lost much of its apparent intricacy. The improvement claimed for this articulator was its ability to record and transmit in the movement of the mandibular portion of the articulator the precise movement of the condyle upon each side. This was made possible by having selective condyle path plates, attachable to the articulator according to the requirements of the case. The condyle path register differs from the Snow face-bow in that the records of the movements of the mandible are made upon cards placed upon

FIG. 14.



Shows method of determining slant and form of condyle path.

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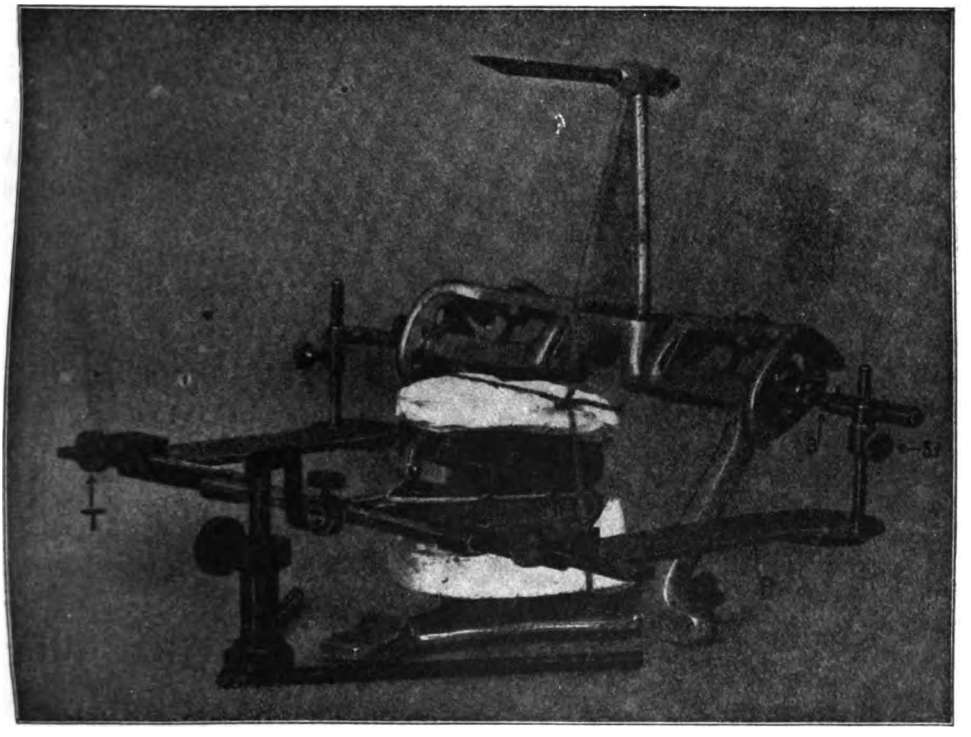
the face in the condyle region. The metallic mouthpiece, termed a horseshoe plate, for attachment to the bite waxes, has several sharp projections upon the under surface for securing it in the lower bite wax. The condyle path register consists of a transverse bar with right-angle arms, right and left, each carrying a graphite point contained in a tube operated by spring tension. The bow is attachable at the middle to the horseshoe plate. The positions of the condyles having been predetermined and marked by crayon, the graphite points on the transfer bow are adjusted to these points. A card is then interposed between the face and the graphite point, with the lower edge of the card parallel to the arm of the transfer bow. The mandible is then moved in all directions by the patient, right and left and up and down, with resultant marks upon the card. The records of both sides are taken upon the same card (Fig. 14). The records of many cases show what great variance exists in the paths of the condyles. No two cases are exactly alike and no two sides of any case are the same. The records obtained, the card is then carefully removed. The graphite points are then securely fixed in position, the condyle path register with the waxes *in situ* is removed and prepared, by attachment to the holder (Fig. 15), for attachment by plaster to the articulator. The card record is used for

FIG. 15.



Shows models ready to be attached to articulator.

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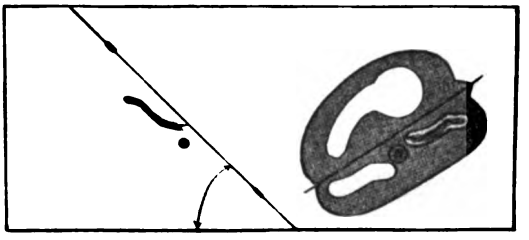
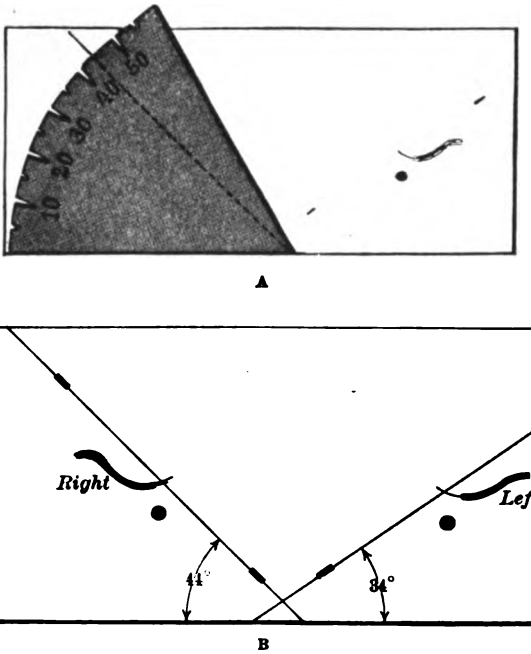
obtaining the angle measure of the condyle movement. This is secured by the selection of a condyle path plate (Fig. 16), containing slots one of which will accurately include the line marked. Marks are made in the middle and at each end of the plate, and a line drawn through these will indicate the main line of direction of the condyle path passing through the end marks. By the use of the angle measure (Fig. 17) the degree is obtained. The condyle path plate is then adjusted to the articulator and set to the degree indicated upon the record —right and left side (Fig. 18).

FIG. 16.



Shows how main direction of condyle path is found by means of the slotted plate.

FIG. 17.



A

B

A, Shows mode of measuring angle formed by condyle path and lower border of recording card. B, Shows completed measurements of condyle path.

Another unique feature of this articulator is the incisor bite guide. Provision for this is made by the placing

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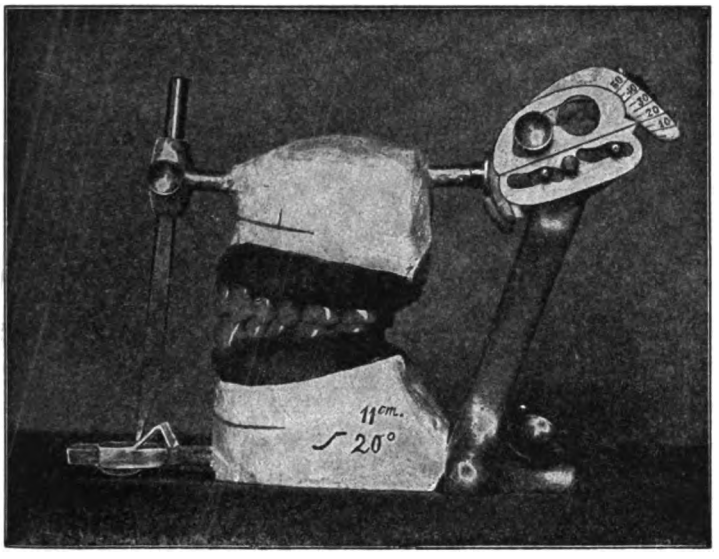
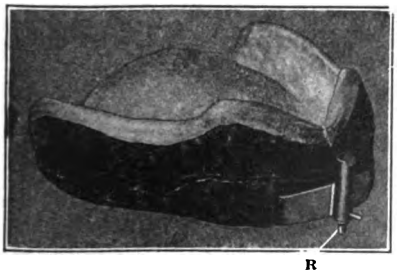
upon the upper wax bite a small register (Fig. 19), consisting of a brass plate bent at an angle on each end for insertion into the wax. Upon the face of the plate is a tube containing a pin operated by a spring. With the horseshoe plate in position, a film of dark wax the thickness of a sheet of paper is spread upon its upper surface. The patient then moves the mandible from right to left and protruding, for a few minutes, until a definite triangular outline is formed (Fig. 20). Marks are then made upon the upper wax at the points of depression in the sides of the horseshoe plate to indicate the relative position of the upper and lower waxes. The wax bite plates are fastened to the

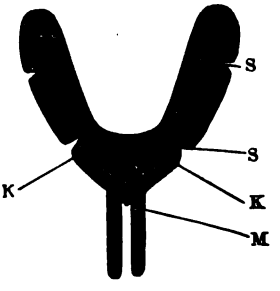
FIG. 18.



Side view of articulator, with incisor guide.

FIG. 19.





Small register fastened to upper wax model, and horse-shoe plate with registered incisor path.

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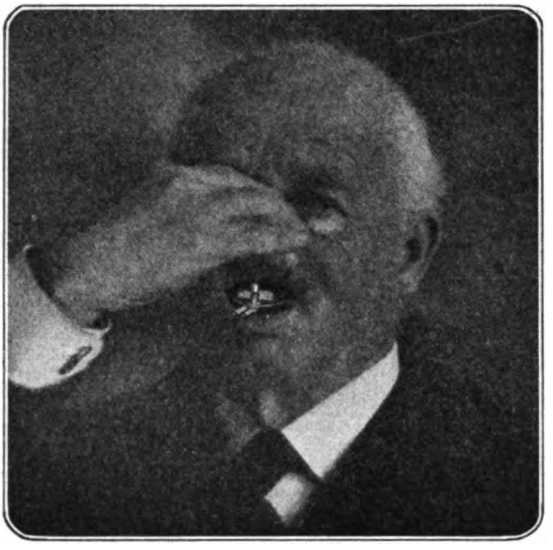
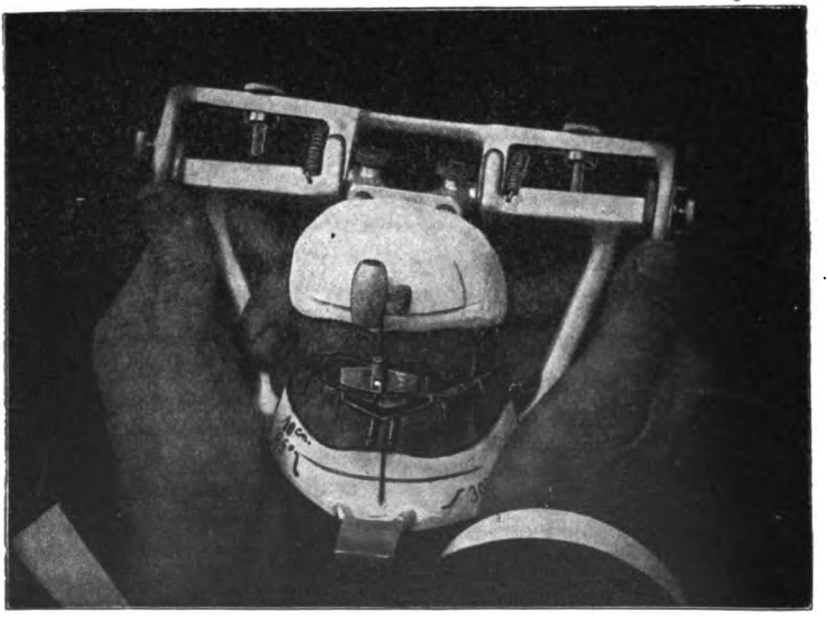
FIG. 20.



Registering the incisor path.

FIG. 21.



Showing how the proper positions of the rear supporting pins (the balancing points) are determined; also how the articulator is best held in setting up the teeth for articulation in lateral movements.

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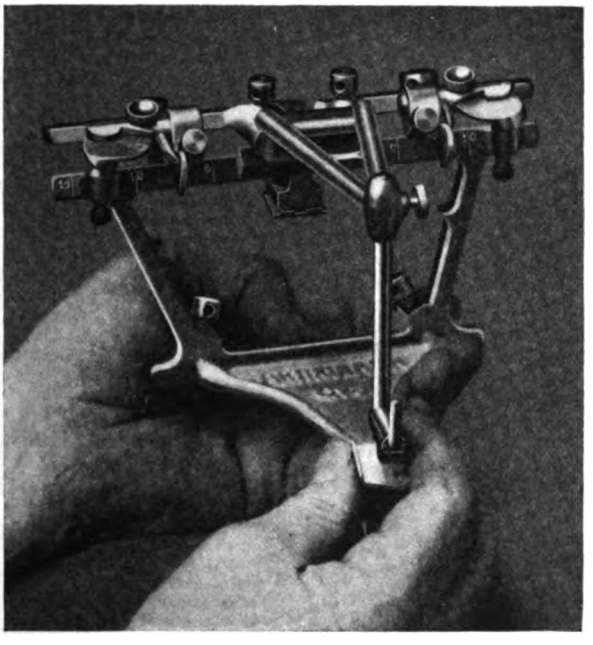
casts and attached to the articulator by means of the condyle path register. The register is attached to the horseshoe plate and fastened to the holder, which permits of raising or lowering of the graphite points to approximate the point of the temporo-mandibular articulation. When the casts have been secured to the articulator, the register is removed, and

two others, destined to supplant it, were offered. The Gysi "adaptable" articulator (Fig. 22) differs from the former articulator in that the selective condyle path plates are dispensed with, and both adaptable lateral and downward path plates are attached to the frame to be set according to the degree indicated by the instruments of transfer. The same

FIG. 22.



with the horseshoe plate in position the two supporting pins are set to mark the limitations set by the marks made by the incisor guide (Fig. 21). These form, according to Dr. Gysi, the true rotation points in the mandible. The incisor guide pin, placed anteriorly to the casts, gives full support to the teeth in setting up (Fig. 13, St.).

GYSI'S "ADAPTABLE" ARTICULATOR.

Hardly had the profession been introduced to the Gysi articulator when

procedure is followed as previously in obtaining the condyle path records, but in addition there is provided a lateral condyle path register (Fig. 23). This register consists of an adjustable bow carrying at each end a ground-glass plate. The condyle path register has a double-end graphite carrier, one end horizontal, as in the previous method, and the other end vertical for record upon the under surface of the glass plates, held at the region of the articulation. The degree of angle measure-

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FIG. 23.

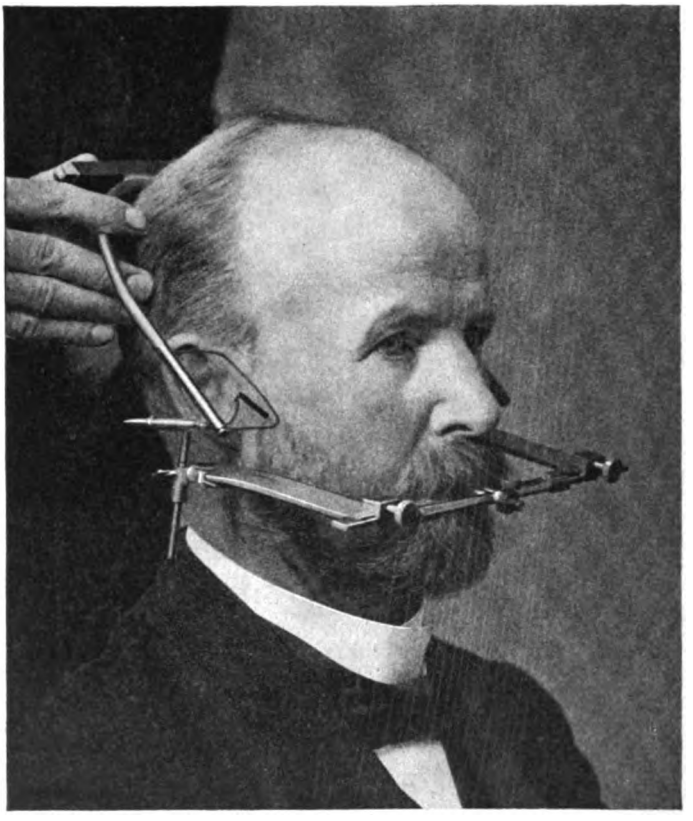
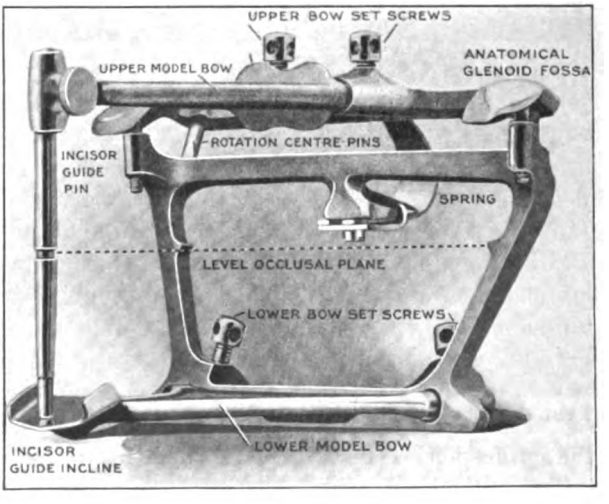


FIG. 24.



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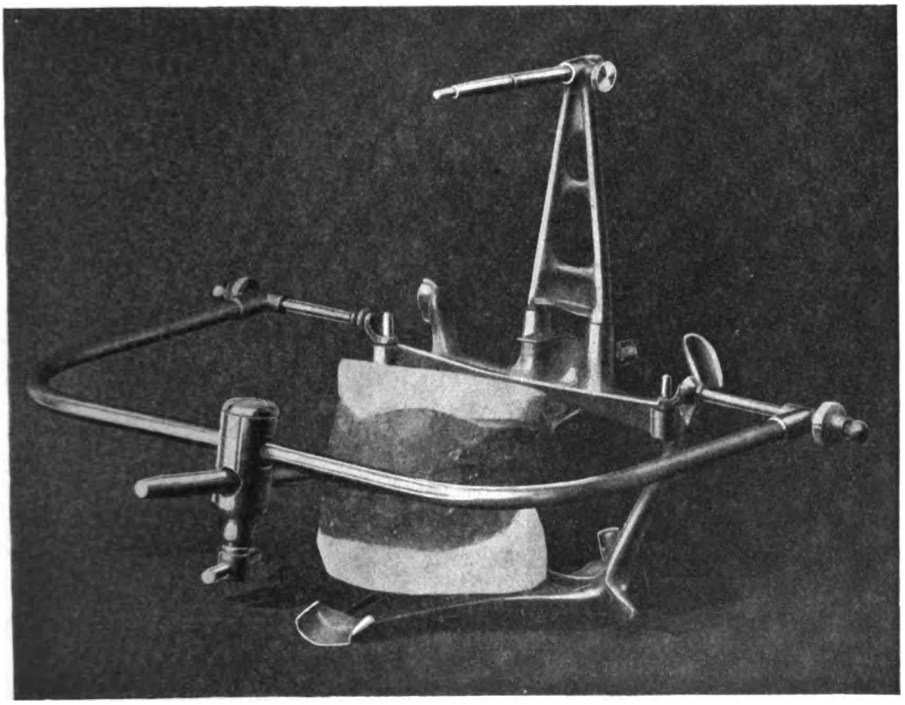
ment on the card is registered by the adaptable downward path plate; the degree marked on the glass plate is registered on the adaptable lateral path. The condyle path is so constructed as to give the curve which is natural to the glenoid fossa, operating over a post to correspond to the condyle.

ments of dentists who desire to meet in the best possible manner the requirements of each case." If it were Dr. Gysi's object to interest those who have never used an anatomical articulator and induce them by its adoption to pass on to something better, then its mission will not be fruitless. It offers many advan-

FIG. 25.



GYSI'S "SIMPLEX" ARTICULATOR.

The latest articulator offered by Dr. Gysi is the "Simplex" (Fig. 24). This is a modification of the "adaptable" articulator, and to many of the profession seems to be a step backward. This is explained by Dr. Gysi, collaborating with Dr. Clapp, in the *Dental Digest*. On page 8 of the January 1913 issue Dr. Gysi says, "The Gysi 'Simplex' articulator will not satisfy the requirements which the early articulators lacked. It possesses many of the excellent features of the "adaptable" articulator, viz, the curved glenoid fossa, the condyle post, and the incisor guide. The articulation, however, is fixed at an angle of 33° forward and downward inclination, and 16° lateral inclination, and, contrary to all the later deductions, is made the same on both sides. This angle of 33° is explained by Dr. Gysi by saying that a large percentage of examined

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cases indicates a close approximation to this degree. The transfer of the bite waxes may be made by either the Gysi condyle path register or the Snow face-bow. In the latter case, small projections are placed upon the condyle posts (Fig. 25), to receive the depressions on the adjustable rods. The use of the transfer instruments, however, is not demanded in this method. Projections on the upper portions of the mandibular part of the articulator, on a plane with either a notch on the incisor guide pin or an adjustable incisor guide placed in the position of the notch, mark the occlusal plane.

FIG. 26.

FIG. 27.

THE WEISS ARTICULATOR.

In the productions of Dr. Gysi the ultimatum in apparatus seems to have been reached. To say, however, that the last word regarding the solution of articulating problems had been said would be most unwise, for there are those who are still delving into the unsolved, the results of whose labors are still to be recorded. About two years ago, Dr. Weiss of Havana presented before several societies in Europe an articulator whose construction and basic principles radically differ from any other in existence. The maxillary portion is fixed upon a standard and fastened securely to the bench. All movements are produced by the mandibular portion—thus mechanically reproducing, as far as possible, natural conditions. Those who have seen its operation and the results obtained by it have been most enthusiastic about its possibilities. Unfortunately there is no specimen of the articulator in this country, as far as I am aware, nor any illustration which I am able to present to you.

SCHWEITZER'S PROJECTED ARTICULATOR.

For many years one of my valued associates at the New York College of

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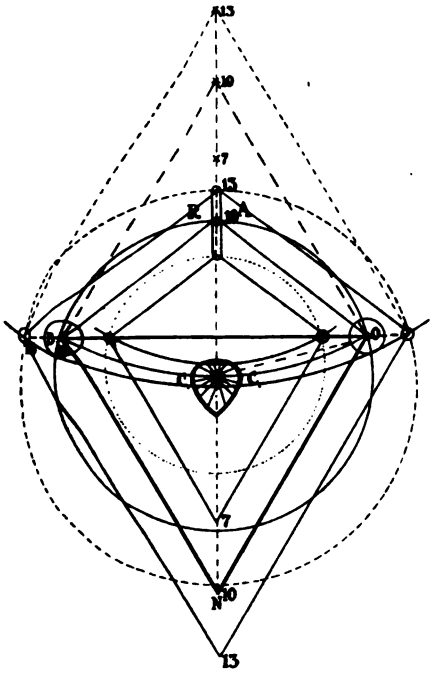
Dentistry, Dr. H. Schweitzer, has been investigating this subject of articulation, and has devised an articulator which also differs radically from all others, in that the rotation point of the mandible is placed at the position of the vertebral axis. This conclusion was reached after the examination of many

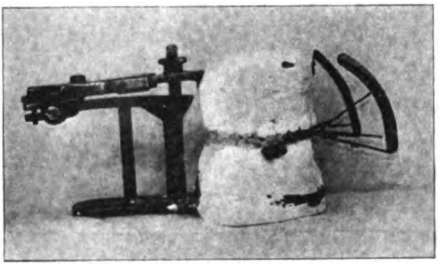
FIG. 28.



The rotation axis of the mandible.

hundred articulated skulls, and, as can be seen by these specimens (Figs. 26 and 27), applies to animal as well as human skulls. The movements of the mandible, as all investigators have found, have been so difficult to control that if it were possible to obtain an instrument which would furnish a fixed rotation point, much would be gained. Dr. Schweitzer has endeavored to geometrically prove his contention by constructing a double "Bonwill triangle" (Fig. 28), showing calculations upon three sizes of arches, 7, 10, and 13 cm. respectively. These triangles are constructed with a common base. Using the apex of the occipital triangle as a radiating point, he inscribed an arc through the condyle points. Bisecting this arc by a line bisecting the two triangles, the points of intersection furnished the centers of circles which when projected *were found in every case to pass through the center of the foramen magnum*—the position of the vertebral axis. Basing his deductions upon these facts, he constructed

FIG. 29.



an articulator (Fig. 29), having a fixed point in the region of the vertebral axis, adjustable by face-bow to the requirements of a given case. The bite relations are registered by an incisor path guide and a molar path guide. While this articulator is still in a somewhat unfinished stage, the projected articulator will certainly offer some unique features to apply to the practical restoration of teeth in their true anatomical relation.

CONCLUSION.

My object in this *résumé* has been twofold: First, to show how much labor has already been expended upon a most important part of our work; and second, to stimulate, if possible, the interest of

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the practitioner who is still holding to the use of the plain-hinge articulator.

The work in this direction which is today required of the undergraduate in all the colleges of the land will, we trust, in a few years begin to bear fruit. So many operations are dependent upon proper articulation that the edentulous case bears but its proportionate share in the consideration of the subject. The efficiency of our bridge work and our partial dentures depends largely upon the provision we have made for proper resistance of stress, and this can be best provided for by the use of an articulator which, during the procedures of construction of the denture, will show the various conditions which the restoration must meet. If this paper shall have aroused interest in even a few of my hearers, then the effort will not have been in vain.

DISCUSSION.

Dr. H. L. WHEELER, New York. This description of the development of the articulator has been so complete that it is unnecessary for me to comment upon it. I wish, however, to call attention to one or two points. The articulators that are very largely in use today may be said to be, first of all, the Twentieth Century Articulator (Dr. Snow's), the Gritman articulator, and that of Gysi. Professor Gysi, of course, in his articulator has obtained practically two features that are wanting in other articulators—that is, the retention points and the ability to produce lateral motion. As the condyle slides down over the glenoid fossa, over the eminentia articularis, there is the protrusive movement which brings the jaw outward and forward, and the lateral motion, and these motions are obtained in the Gysi articulator. With this feature we have had practically no experience, and Professor Prothero, in a paper read before the First District Society this winter, did not place as much dependence on that as upon having an adjustable condyle path. The Gysi articulator is a complicated one, and probably represents as perfect a means for reproducing the various movements desirable in the mandible as has been or will be obtained for some time by any mechanical appliance. In the Simplex articulator, which is within the means of, and which can be operated by, the average dentist, one of the most vital necessities of a good anatomical articulator has been eliminated—that is, the adjustable condyle path. This articulator has a condyle path which allows for the protrusive movement and for the lateral movement, to be sure, but this is set at a certain fixed degree on the scale—I believe the essayist said it was at 33°. Since there is, however, a wide difference in the angle of the condyle path in different mouths, also a difference in the angle of the condyle path on either side in almost all individuals, I believe it to be essential for obtaining the best results, and up to date, that the condyle path be adjustable. The Snow articulator possesses this feature in the most simple and

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readily understood form. Of course it is desirable, if possible, to get the other movements, but it is also desirable to have the articulator simplified so that the average practitioner may understand it, and it has been found difficult to embody in an articulator all the movements of the mandible.

I wish to further speak of one or two items in relation to the setting up or properly articulating the teeth in or upon the anatomical articulator. At the present time the profession is greatly interested in, and very enthusiastic over, the probability of obtaining what are called perfect anatomical molds of porcelain teeth. To a certain extent, of course, that is desirable, but there is one feature, so far as my observation goes, that has been neglected in considering the question of obtaining correct anatomical occlusion in artificial teeth. The average individual who needs a complete upper and lower artificial denture has arrived at the age when the cusps and grinding surfaces of the teeth are comparatively well worn; the high, well-marked cusps of the anatomical artificial teeth, which are obtained from very perfect natural teeth that have not been worn, will therefore not work in the mouth of the average individual who needs a denture! There are reasons for that. The natural teeth are set in bony sockets and in cushions of peridental membrane, and, as the teeth move forward, backward, and laterally, there is a certain amount of motion which allows each tooth to give, and allows for the changing of the direction of the movement. So far we have found no means whereby it is possible to make artificial dentures in any other way except so that the teeth stand in relation to each other in a perfectly rigid manner. There is no individual motion whatever in the approximal relationship of artificial teeth. The teeth in an upper and lower denture in moving over each other are incapable of reproducing the movements of the natural teeth in their alveoli, and that means that artificial teeth must have lower and flatter cusps. If the teeth of a man of eighteen, twenty, or twenty-five years of age, the cusps of which are very little worn, are reproduced in porcelain and set up rigidly in an artificial denture, they will interfere with the movements of the mandible. Even though the idea of anatomical teeth be theoretically correct, allowance has to be made for the rigidity of the artificial denture. Besides this, another feature has to be taken into account: The average edentulous individual has lost his teeth at different times, and this progressive loss generally results in a decided change in occlusion, which will inevitably bring about a change of the condyle path sooner or later. Nature will adjust herself to that change—which is very fortunate, for if it were otherwise, dentures made on a plain-hinge articulator would not work. Most patients could not adjust themselves to dentures made without any consideration of the proper anatomical movements of the mandible; but because nature makes an effort to readjust the relation of the condyle to the glenoid fossa, and its movement over the eminentia articularis, mankind finds it possible to go on chewing with less movement and less convenience, and so the average wearer of a denture manages to get along somehow.

I wish to emphasize Dr. Hillyer's plea that artificial dentures, as far as possible, should be made so that it will be easy for the patient to adjust himself and to enjoy as easy a use of the man-

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dible as when he had a complete natural denture. In the dental colleges the classes are now being strongly impressed with the necessity of understanding the principle and practical use of the anatomical articulator, and in the course of time, I believe, a large number of dentists will solve these problems in such a manner that their patients will be very much better served than they have been in the past.

Dr. L. M. WAUGH, Buffalo. I should prefer to discuss this paper reversely, and speak first of the Gysi articulator, because with this apparatus the condyle movements may be most nearly registered and reproduced, and the technique of application of this apparatus is not as complicated as we have been led to believe. The Gysi articulator has not been practicable until the construction of the recent Gysi scientific articulator. The first one was not practical, because it was made of soft metal. The face-bow was made too soft, and if, in attempting to register the movements of the condyle, any resistance was met, its parts would yield so that a sufficiently accurate movement of the condyle was not obtained. For that reason I believe that the Snow face-bow, in combination with the New Century articulator, while it does not attempt as much as the original Gysi articulator, will yet give uniformly good results for practical work. In the new scientific articulator of Gysi, the softness of the metal has been overcome, and it has been made sufficiently rigid for it to effectually register the movements of the mandible. Those who wish to come near the ideal in prosthetic work will find the Gysi articulator to give the best result that can be obtained, but the New Century articulator together with the Snow face-bow, with which we are perhaps more familiar than with any other anatomical articulator, will give sufficiently accurate results for practical purposes. The Gritman articulator with a fifteen per cent. descent condyle path, and with a fixed path, gives excellent results as compared with older articulators, but the teeth require more grinding than if we set the general direction of the condyle path to suit the individual case, as may be done with the New Century articulator.

When any new invention is brought before the profession, there are a few enthusiasts whose attempts are beyond the practical, and that has been the case with anatomical occlusion. Some men attempt what is away beyond the practical, and they have developed and advocated a technique so complicated that it frightens the average practitioner out of the hope of ever mastering it. Anatomic articulation is not a difficult process; it is simple if we use the Gysi articulator, and still more so if we use the New Century and the face-bow. I feel that in the hands of the average practitioner the apparatus which does not require too much scientific measurement will give better average results than one that does.

Dr. Wheeler has spoken of one or two items in relation to occlusion, the topography of the teeth, and temporo-mandibular articulation. The argument is often advanced that the Snow face-bow is not absolutely accurate. That is true, but can we get anything absolute? If we examine a skull we find the bony head of the condyle fitting in the bony depression of the glenoid cavity, and for years the question of anatomical occlusion was based upon this more or less fixed bony structure. Upon a closer study of the skull, however, we find that,

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interposed between the condyle head and the glenoid fossa there is a yielding fibro-cartilaginous tissue. In articulation this fibro-cartilage moves more or less back and forth with the movement of the condyle, and there is more or less play in the joint. It is not fixed, like a machine, and there is a certain power of accommodation to which Dr. Wheeler referred, and which largely facilitates our work. In trimming the bite-plate, unless we have the proper amount of wax so that when the patient brings the jaws together there will be sufficient stress to cause the yielding of the ligament in the joint, we shall find a slight opening sufficient to reduce the masticating power necessary for the reduction of foods that offer resistance, such as meats. This factor must be borne in mind, and no matter how accurate our measurements are, and what scientific possibilities an apparatus offers, we may still not obtain the maximum efficiency. There is a certain amount of accommodation in the parts that allows nature to adjust matters. It is common knowledge that dentures are constructed without consideration of the condyle path and the distance of the models from the joints. Yet patients become accustomed to dentures thus constructed—for two reasons: First, they learn to masticate without the use of the lateral motion; secondly, owing to the yielding of the tissues mentioned, during articulation, the denture becomes more comfortable in a year or so.

So much has been said with regard to anatomical occlusion that I do not know which phases it would be best to discuss in detail. The establishment of the retention center is possible with the Gysi, but not with the Snow articulator, and is important in many cases. The incisal guide, while, in my opinion, it is not of much use, gives a little rigidity. One objection to the New Century articulator is that, if one has not learned to use it carefully, he may spring it just enough to throw the bite off, and this is prevented by the incisal guide. This is a feature of the Gysi articulator that the New Century articulator does not possess.

It was my good fortune to know Dr. Gritman when he first had the inspiration of constructing an articulator. I have followed the development of this work, and in studying the different kinds of articulators I have become convinced that the possibilities for producing anatomical occlusion with any one of the anatomical articulators will permit us to make dentures which are efficient from the beginning, and which the patient may learn to use correctly with a minimum of discomfort. With the anatomic method of articulation we are able to obtain results that we could not obtain with the old method.

One point is essential, and I cannot emphasize it too strongly, namely, that we must use a face-bow of some sort and establish the proper cuspal relationship. In other words, we must have the proper occlusal planes of the teeth in artificial dentures, and just in proportion as we do that will our patients find themselves able to accommodate themselves to the plate. But unless we use the face-bow and establish proper articulation, we shall lose one of the most important advantages that anatomical occlusion affords. It does not matter so much what anatomical articulator we use; but we must be acquainted with the method of its application. Its use decreases the tendency to failure; still, obstacles remain that it will not over-

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come, although it promises to do much better work than has been accomplished before.

We hear so many practitioners say that they are not interested in this work, that their aim is to care for people who appreciate their teeth and want to save them. These practitioners are closing their eyes to one of the greatest possibilities for the improvement of our efficiency. The aim of modern dentistry lies in prophylaxis, and in the recognition of the fact that the deciduous teeth must be saved from their eruption up to the time when artificial dentures become necessary. The lesson learned in using the anatomical articulator teaches us to recognize a new meaning of the contacts of the occlusal surfaces of the teeth. It teaches us that the proper relationship of the inclined planes is a feature of prime importance, and that the grinding and incisal edges of the teeth mean more than we realized in the years gone by.

Dr. HILLYER (closing the discussion). I do not think it is necessary for me, in closing, to add anything to the discussion, which has followed natural lines.

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Can the Illegal Practice of Dentistry be Limited by Law?

By R. OTTOLENGUI, M.D.S., D.D.S., New York.

I BRING before you one of the most serious problems which confront the dental profession of this entire country, and one the solution of which is peculiarly difficult in our own state. In choosing my title, I had first in mind to ask, "Can the illegal practice of dentistry be *eliminated* by law?" but it occurred to me that, up to the present era, with all the laws that have been passed by all the countries in the world, the offender against the law has never been eliminated, so that the query seemed futile. For "eliminated" I then thought of substituting the word "controlled," but this in turn I set aside, because the control of that which in itself is offensive really means the toleration of it, as when the municipality licenses a liquor saloon. It has seemed to me, then, that the best that any law may accomplish would be the reduction of the number of offenses to the minimum, by rendering detection easy and by making punishment sure and swift. In this sense I ask, "Can the Illegal Practice of Dentistry be Limited by Law?" and I unhesitatingly answer, "Yes, it can!"

We have before us, then, the question of the limiting of the total number of illegal practitioners of dentistry to the minimum, and if we look upon illegal practice as an ulcer on the body politic we may think of it as a disease and consider for a moment the etiology thereof, for without a comprehension of etiology we shall never discover the cure of any disease.

THE ILLEGAL PRACTITIONER THE PRODUCT OF THE LAW.

The illegal practitioner is primarily the product of the law. Secondarily, he is the result of both laxity of law and lack of law. I may explain this statement very briefly. Before we had any dental statutes we had but two kinds of dentists—the ethical man and the quack. When the states began to enact dental laws the situation became complicated, because at once we literally created the illegal practitioner—for were there no law regulating the practice of dentistry, there surely could be no illegal practitioner. Furthermore, the complexity is increased when we consider that nowadays it does not follow that, because a man is practicing illegally, he is a quack, nor can we call all the charlatans ille-

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men. Some of the grossest offenders against the code are nevertheless legal practitioners—and to this extent at least the laws have injured the people, by giving countenance and legal standing to men who, in the absence of laws, would be readily recognized as quacks. I make this point at the outset because I desire to have it distinctly understood that I am in no sense studying this problem from the angle of ethics. In this paper I recognize the legal right of any licensed dentist to advertise if he chooses to conduct his practice in defiance of ethics and good taste. The man aimed at is solely and only the man who practices in defiance of the law, and it matters not whether he conduct his practice ethically or unethically, he is an offender in the eyes of the law, and as such cannot consistently rise and say that he is mistreated in this argument.

I have shown that the illegal man is the direct result of enacting laws, and I have said that he has increased in numbers because of laxity in law and because of lack of law. By *laxity in law* I mean laws which, however well intended they may be, are ineffectual either because they are not or because they cannot be enforced. The law of this state is in this class. By *lack of law* I mean laws which permit things which should be prohibited. For example, the New York statute describes so-called mechanical dentistry, and permits the unlicensed man to practice that particular brand of dentistry. By this lack of law we have countenanced the laboratory in which is trained and from which is graduated, without diploma, the illegal dentist. This particular phase of the problem is one to which I merely allude, as it is not my intention in this paper to really discuss the laboratory man, or mechanical man, at all, further than to suggest that it is a problem in itself that well might be investigated by our Board of Regents, with the end in view that some just, proper, and effective statute regulating the practice of "mechanical dentistry" might be enacted. By effective, I mean that the statute should be effective in terminating the existence of these unlicensed schools of dentistry from which are turned out a steady stream of unlicensed dentists.

THE OBJECT OF DENTAL LAWS.

Before the discussion of any dental law, we should fully agree as to the object which the law is to serve, and I am sure that many statutes have proved ineffectual because drawn by men who did not have the true object in view. A dental law must obey the rule of all laws, which means that it should be enacted in the interest of the whole people, and not for the benefit of either the individual or any class of individuals. Thus the statute should not be intended to improve the status of the dentist, of the dental society, or of the dental school. On the contrary, if it be in the interest of the people at large, the law should unhesitatingly restrict the conduct of the dentist, the conduct of the dental society, and the conduct of the dental college.

With this purpose in mind, let us ask why it is requisite to protect the community against the dentist.

INTEREST OF THE COMMUNITY IN DENTAL LAWS.

To bring my argument to a point which can be quickly grasped by even the slowest mind, I will first compare the community at large to an automo-

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bile. Anyone who has ever seen an automobile completely dismembered knows that it is a marvelously complex mechanism, with a multitude of ingeniously constructed parts, so assembled that when all are in order we have harmonious co-ordination which results in the perfect working of a perfect machine; a machine that responds readily and promptly to all calls; that will travel fast or slow, up-hill or down-hill, and turn easily for every deflection in its course. Even the man who has never seen a machine taken apart, knows this in a general way—that an automobile must be in thorough order to render the highest service. We all recognize, therefore, that the slightest disarrangement of parts must interfere with the wonderful co-ordination of all the other parts—and to that extent, at least, efficiency is proportionately lessened. But we know another thing, and that is that a trifling accident, such as the loosening of a nut, if neglected, may result in a stoppage of the whole works, or at least may transmit damage to a more important part.

A perfect working community is composed of a similar co-ordination of numerous units all working for and aiding the work of one another. The harmonious working of all these units depends, of course, upon many factors, but the chief factor of all is *health*, and any disturbance of the health of the community causes a proportionate lessening of its efficiency—a depreciation of output. It might seem hard to show that the sickness of a single individual can be a matter of much concern to the whole community, but really it is not so difficult. A number of cases of scarlet fever occurring in a school frequently causes the closing of the school—and this outbreak must have originated in the illness of one child. Thus, perhaps, the education of a thousand or more children is temporarily stopped; the presence of these young people at home instead of at school disrupts the family routine by adding to the burdens of the parents, and this in turn may greatly interfere with the business interests of persons far removed from the original cause of disturbance. I could give many examples, but this one will serve: A man recovering from typhoid fever, about three years ago, was permitted to return to work in a dairy in New Jersey, and within a brief period there was an outbreak of typhoid on Washington Heights, New York City, which resulted in the death of two or three persons and the illness of a score. Thus the health or illness of one man was a matter of concern to a community in a different state.

I need not argue before this body of dentists that the condition of the teeth of a man bears a close relation to the man's health. But I wish now to compare the individual to the same automobile to which we likened the community. Like that wonderful machine, he is composed of hundreds of co-ordinating parts which produce the highest efficiency only when a state of health exists. A speck of dirt in a carburetor pipe may stop the best six-cylinder car from climbing a hill, and a piece of poorly masticated food may clog the digestive apparatus of a man and terminate his work in a quite similar manner.

Perfect health of the individual depends primarily upon the proper mastication of food, and secondarily upon the proper assimilation of food. The slightest accident to this masticating apparatus, as for example the loss of a cusp of a single tooth, lessens the efficiency of the entire body proportionately. But

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the neglect of caries in teeth often results in a diseased condition of the tooth roots, which if not cured causes a continuous contamination of the body itself, interfering with food assimilation and materially lessening the power of the body to resist infectious diseases. Thus in quick sequence we may have—First, tooth decay; second, exposure and death of the pulp; third, infection of the pulp and apical disease. If this be neglected, or what is just as vital to the community, if this be improperly treated or be left untreated by the dental attendant, then may follow—fourth, a continued draining into the system of infectious material; fifth, a lowering of the vital resistance of the body; sixth, the acquirement of some infectious disease, such as scarlet fever; seventh, the infection of other individuals, resulting in the closing of a school, the closing of a factory, the death of persons important in the business world, etc.

For these and allied reasons, the community has a right to pass laws which shall determine whether a man is sufficiently skilled in dentistry to be given a license to practice.

INEFFICIENCY OF PRESENT LAW OF NEW YORK.

Having shown that the community has a right to pass a law regulating the practice of dentistry, before we may logically ask for a change in the existing laws we should show that the existing laws are ineffectual. This is so abundantly true of the New York statute that there is scarcely an argument against the present law that I can advance that is not well known to all of you. However, I must point out at least the most flagrant flaws.

The chief difficulty is that the law does not provide any adequate means for its enforcement. The discovery and prosecution of illegal practitioners is placed in the care of this society. This is a compliment to the society, but is a gross injustice to the citizens of this state. The prevention of the illegal practice of dentistry should be one of the most sacred duties of a state to its people, and yet we find this Empire State of the great United States of America satisfied to free itself of this duty by turning it over to a private society, whose members have neither the time nor the money to properly safeguard the health of the people.

In other departments of police work we find regularly organized corps of efficient men, all receiving salaries, and with moneys provided for the expense of apprehending offenders against the law. But in this exceedingly vital department, the New York State Society is asked to furnish out of its own pocket the moneys needed for apprehending the offender, securing the evidence against him, and even for supplying the attorneys for prosecuting him. In case of conviction and fine, the fine is paid back to the State Society, and this is a double wrong. It is wrong, first, because the remuneration of the policeman should not depend upon the conviction of the man arrested, since this is bound to bring about an injustice either to the prisoner or to the prosecutor. It is wrong because, since the pay of the policeman, the witnesses, and the prosecuting attorney must depend upon the moneys collected in fines, it is a natural consequence that the appeal to the judge will be for a fine, when all arguments should be for the imprisonment of the convict. As an example, in the Second district we secured a fine of $500 against an

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illegal man, who smilingly drew out his check-book, settled with the court, and jumping into his big limousine, hurried down town to superintend the opening of a new office. The imprisonment of ten such men will better serve the people at large than the collection of ten thousand dollars in fines.

As the law has stood for years, and as it would still stand even if the amendments recently pending before our legislature had been passed, this society must have charge of this work and must furnish a committee to superintend it, which committee must give its services free. Why should our members work for the state free? Does the governor work without salary? Do the assemblymen and senators who make these laws, give their services gratis? Dr. Wm. Carr has rendered such service to this society and to this state for years, without very much thanks from either the society or the state. This is very honorable conduct on the part of Dr. Carr, but it is not so very honorable on the part of the society or the state to accept such service. For not only must Dr. Carr, and other members of the law committee, do this work at great sacrifice of time and money, and without remuneration, but they find themselves actually in a position of receiving threats on the one hand, and of suspicion on the other. I do not know about Dr. Carr, but Drs. Rogers and Johnson, who have done similar work in the Second district, have not only received many threatening letters themselves but similar letters have been sent to the women of their households.

"GRAFT" AND PROTECTION OF UNLICENSED DENTISTS.

Let me explain what I mean by suspicion. New York state, and particularly New York city, is fairly riddled with what is called "graft." The most lucrative form of graft is the exaction of monthly payments for the privilege of doing an illegal act without police interference. The collection of such money is usually made by some person in a very subordinate position, and he invariably explains that he is only acting for "a man higher up." This "man higher up" is a convenient cloak for the actual receiver, and the ingenuity of the scheme lies in the fact that it is never explained how much higher up the money actually goes. The limitation is left to the imagination of each person studying the problem. Thus, if you choose, you may decide that it goes no higher than the ward man; or you may believe that the captain gets a slice of the graft cake, with perhaps a bit of the frosting going to the inspector, and some of the filling to the commissioner. Then there are others who believe that some cakes are delivered uncut to party bosses, or even higher.

This is the sort of position that this society is asking its honorable members to occupy, when electing them to membership on our law committee. It is common belief in New York city that illegal men are promised immunity, protection, and even non-arrest, in exchange for a definite sum paid monthly. Dr. Carr does not believe that any such systematic blackmail exists. Some men are so highminded and honest themselves that they cannot believe that other men can be dishonest. But Dr. Carr is almost the only man in New York city who has at all studied this matter and still believes that graft does not exist. I am sure that both Dr. Johnson, the present law-committee man of the Second district, and Dr. Rogers his prede-

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cessor, will testify that graft exists in their district. For this reason Dr. Rogers has refused to serve longer, and Dr. Johnson has asked to be relieved.

Of course it is always difficult to prove the existence of grafting, though just at present enough of the truth is coming out to satisfy us all that the rumors of the past, even though no legal evidence existed, were founded on facts. So it is in the dental situation; I cannot give you legal proof, but I can tell you of the present system, and give you the rates. Formerly the charge for an individual illegal dentist was ten dollars per month, and each man settled with "the man lower down," the blackmail collector; by the way, sometimes "the man lower down" is a woman. At present there is an association, the members of which are assured protection at twenty dollars per month, the fee for having an unlicensed assistant being five dollars per month. Just how this immunity is obtained and to whom the money is paid, it is less easy than ever to discover. But this is the condition which is said to exist; perhaps it does, and perhaps it does not. The point of interest to us is that we are not and cannot be certain that it does not exist, because such is our law that it is possible—which is quite sufficient reason why we should make a new law that would render the continuance of such conditions as nearly impossible as we may.

Now I have that to say which I cannot say with too much emphasis. I myself am somewhat like Dr. Carr; I take an optimistic view of my fellows. I do not believe that all men are dishonest till proved honest; I prefer to think a man honest till proved otherwise. Hence I never have believed much in this mythical "man higher up." I have never thought of this straw man as anything but a cloak for the real crooks. Consequently, I do not believe there is any such person in the dental situation, but I do believe that our law is such that we are compelled to rely too much upon agents who are sufficiently unscrupulous to blackmail illegal men, taking money from them, and whispering as they take it, "Of course this goes higher up."

I have been asked, "How can this be, when the immunity is actually delivered?" The answer is simple. The members of our law committee are compelled to rely upon attorneys, and they in turn must leave the collection of evidence and the arrests largely to the work of agents. There is very little money in these cases for our attorneys, none at all for our law committee, and it is not strange that the real work should be left to the agents and sub-agents.

But, gentlemen of the New York State Dental Society, the situation has become intolerable. We have no longer the right to ask men to work on our law committee in the presence of such conditions. If this society has any self-respect, if it has any conscience, if it has any sense of its duty to the people, we should, before we adjourn, pass a resolution notifying the governor of this state that one year from date we will terminate our contract, and abandon this police work. We should notify this state that it may either leave our people unprotected prey to the illegal and incompetent dentists, or else place upon the statute a law which will adequately meet the situation. Can such a law be framed? It can!

THE ADEQUATE LAW.

That the limiting of illegal practice of dentistry is not easily accomplished is in-

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dicated by the fact that no law yet passed in any state has proved entirely satisfactory, nor has any law long remained unaltered, which shows a constant admission of inadequacy in the statute altered. But the later and apparently the better laws have certain features conspicuously present. The chief of these are—1. That the state shall prosecute offenders. 2. That all dentists shall register annually. For a solution of the difficulties in this state I would suggest that a committee should be appointed to frame a new statute which shall contain the following main features:

First: The illegal dentist being an offender against the health interests of the state, his prosecution should be placed in the care of the board of health. I make this suggestion because I have been informed that the boards of health may prosecute without appeal to county prosecutors. If this be not true, then my plan would be that the detection of the illegal man should be given into the care of the board of health, and the prosecution left to the county officers. When I refer to the board of health I touch upon a subject which will require some study. I would prefer that in large cities the work should be in the care of the local board of health, but as there are no local boards in suburban districts, it will be necessary to include the state board of health in this work in some manner. Perhaps the state may be divided as at present into judicial districts, and where there is a large municipal health board, as in New York city, that district might be cared for by the health board there. These boards of health should provide a sufficient number of inspectors to constantly investigate infractions which might be reported. If necessary these may be exclusively dental inspectors, or it may be possible to add this work to the duties of men already on the city pay-roll. But these men should be city servants and not private agents, as at present.

Second: ANNUAL REGISTRATION. Every dentist in this state, now practicing and hereafter entering practice, should be compelled to register annually, and his right to such registration should be the exhibition of his state board license, with proof that such license had been issued to him and to none other. False registration should be severely punished by a heavy fine or imprisonment, or preferably both. A fee of one dollar should be collected for each annual registration. Failure to register prior to a specified date should subject the dentist to a fine of one dollar for every thirty days of delay. Other states have adopted annual registration with advantage, but I believe that an improved plan of registration would greatly increase the effectiveness of the law, while decreasing the chance for evasion and the levying of blackmail. My idea is that while the supervision of the practice of dentistry should be in the care of the health board, the registration should be in the care of the board of examiners. This board issues the license to practice in the first place, and should care for the registration. They would be better qualified to prevent false registration, and moreover would serve as a foil against possible blackmail by the health board inspectors. One member of the board of examiners therefore, possibly the secretary, should have added to his duties the care of this registration, and perhaps might best be called the dental registrar. This man should have a salary, and all demands for money involved in the expense of prosecuting

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illegal men should be vouched for by him and should be paid upon such voucher by our State Society treasurer. To this extent, and to this extent only, should the State Society continue in this work. All registration fees, examination fees, and all fines, should be paid into a special prosecution fund, and this fund should be administered by this society as a further preventive against wrongdoing.

The most important part of this registration plan I have yet to outline. Once annually, at a given date, the list of men registered should be published in pamphlet form. This list should likewise contain a list of those who have died, and, as all deaths must be reported to the health board, this dead-men's list should be easily compiled, and thus many "dead men" now practicing dentistry would be compelled to return to their graves and attend to their own private affairs.

Each of these registration pamphlets should be sent to all registered men, and should contain, conspicuously printed on the first page, an invitation to all registered men to report to the registrar the names of any men known to be practicing dentistry whose names fail to appear in the Register. Such an invitation would remove all doubt of the legal right of a practitioner to lodge information against an illegal man, but, better still, the informer would not be making any accusation against the legal status of the other man. He would simply be reporting a fact, as for example "J. R. Smith is practicing dentistry, at ——— number, ——— street, and his name is not in the Register." Moreover, such information should be received as a confidential communication, just as at present a tenant in an apartment house may report that the plumbing in his apartment is not in order. Upon receipt of such notice, a health board inspector calls and inspects all apartments, thus protecting the informer. Upon report of the existence of an unregistered dentist, the dental registrar will report to the board of health, upon which the dental inspector will call. If the man can show a license, he is served with an order to register within thirty days, the fee being the legal one dollar, plus one dollar for every thirty days which had elapsed since he should have registered. Failure to register after receiving such notice should render the man subject to citation before the board of examiners, who may either fine him and permit him to register, or recommend him to the Regents for revocation of license.

I believe that such a law would greatly reduce the chances of practicing illegally, and would furnish at one and the same time both the machinery and the money needed for limiting the illegal practice of dentistry. I am prepared to present further argument if needed.

DEFINITION OF DENTISTRY.

We have seen the course to be pursued when the dental inspector calls upon a licensed man who has failed to register. We have now to consider his course when he enters the place of a man who cannot show a license for himself or for his assistants. It must be the legal right of the dental inspector to demand the exhibition of a man's license, failing which he should be liable to immediate arrest. At present the burden of proving that a man arrested has actually practiced dentistry lies with the prosecution, and the law has so protected the accused with technicalities,

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and judges are so little conscious of the seriousness of the offense, that it is most difficult to convict the first time, and well-nigh impossible to convict of a second offense. This is so true that a large proportion of the men who have been convicted, and so reported to this society, are still in practice; and it is this glaring fact that leads men to believe that these men who have once been convicted, who have not since qualified legally, and yet who are still in practice, must in some way be receiving immunity by the payment of graft. This is not legal evidence, but it is ground for a very logical suspicion.

It follows, therefore, that in some way these technical protections must be removed. I believe the remedy may be found in a definition of "legal practice of dentistry," in such terms that even the presence of a man in a room where there is a dental outfit would suffice for his arrest, the burden of explanation of his presence and his need of such an outfit being upon him. The definition of dentistry proposed in the law recently before the legislature is a great improvement upon any that we have heretofore had, but by studying all the definitions in the statutes of other states, I am sure that even this may be improved. The law should be so worded that a real offender may be easily arrested and convicted, and I am sure this can be done. If not, then it follows that the illegal men have more brains than the legal men.

REVOCATION OF LICENSE.

But our law should not stop with an attack upon the illegal practitioner. We need more drastic treatment of the legal man who employs, safeguards, and trains the illegal man. We already have in our law a rule that such men are liable to have their licenses revoked, yet I am credibly informed that only two such revocations have occurred, notwithstanding the fact that often in court the legal man comes forward and testifies that he is the employer of the accused. The remedy for this is a more rigid enforcement of this revocation clause. If ten or twenty licenses were revoked because of the employment of unlicensed assistants, there is no doubt that practitioners would be less willing to hire these men —saving a few dollars at the risk of losing their licenses.

THE CONDUCT OF DISTRICT SOCIETIES.

I have said that the conduct of societies is rightfully a matter for legal restriction. A fatally erroneous idea now prevails in our district societies to the effect that they are private dental clubs with social rights. Such is not the case, and should not be the case. If any of us desire to form dental societies for special purposes, and with social distinctions, it is our legal right to do this. But the highest duty of the district society should be, not to erect a barrier of ethics to keep men out of membership; the barrier should operate only to keep men in. In other words, a great service may be rendered to the people if we would throw open our doors to all legal practitioners, because all legal practitioners should have the advantage which the district society should afford in providing post-graduate teaching both in practice and conduct. Thus we should only ask the applicant for membership, "Are you a legal practitioner?" If he be, he should be permitted to enter. Having once signed the by-laws, however, he should

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be compelled to abide by them. Our committees on ethics should cease to be ornamental appendages to our stationery. They should comprehend that they have a real duty to perform. Let us suppose that each society member could have a printed certificate of membership which he could hang in his waiting-room, and which could serve as an announcement to his clients that he is not only a legal practitioner, but an ethical practitioner. Then suppose that a member were proved guilty of an infraction, his membership suspended or revoked, and his certificate taken away from him. Would not such a certificate be a business asset as well as a moral aid to a better conduct of the man's practice? I think so. Moreover, I think that in the past our state and district societies have not been sufficiently awakened to their duties. Let us, with the contemplated reorganization, arouse ourselves from this lethargy, and let us extend the hand of fellowship and brotherly love to our neighbors, and let us say in a Christian spirit, "Come thou and abide with me, that we all may be better men, better citizens, better dentists."

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The Operative and Post-operative Treatment of Pyorrhea.

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THE operative treatment of pyorrhea is now so firmly established that discussion of its advisability is beside the question. Owing to the fact, however, that there has as yet been no crystallized method of practice in such treatment, it will be my effort on the present occasion to attempt to portray a method so crystallized as to make it possible for one who has not hitherto made use of it to put it into practice in an intelligent manner, and gain the desirable and beneficial results for his patients so much sought by every conscientious operator.

POLISHING OF ENAMEL SURFACE BY THE AID OF DISCLOSING SOLUTION.

The most essential thing in undertaking any particular operation in surgery is to have a clear conception of the underlying philosophy upon which such operation or treatment is based. Therefore a brief description of the tissues to be operated upon is essential. Pyorrhea treatment should begin on the surface of the tooth; this may seem a little odd, but a moment's consideration of that surface will make my point clear. Since the valuable studies of Pickerill have been presented to the dental public, we have been convinced that normal enamel is not smooth, but is a surface of minute furrows and ridges. As early as 1907, I urged, in a paper read before the National Dental Association,* that a ragged enamel surface is one of the fruitful causes of pyorrhea.

Pickerill's study of the enamel surface, together with the use of Skinner's disclosing stain, emphasizes this fact. The bacterial flora of the enamel surface at the gingival line and interproximal surfaces of the teeth bears a constant relation to inflammation of the gingivæ. A series of recent studies made by the author convinces him that the bacterial flora of these surfaces is rich not only in ferments, but in diplococci, staphylococci, and strepto-bacilli. The constant presence, therefore, of such a rich flora of micro-organisms is a most important

* See *Dental Cosmos* for March 1908, vol. l. p. 240.

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feature in bringing on inflammation of the gingivæ and the underlying bone. Therefore the author has changed his method of treatment to the extent that he begins with the tooth surface first, provided that the case is still in the operable class.

If the case be operable, then the operator should begin his treatment by rendering the surfaces of such teeth absolutely smooth by the use of sharp planes, fine stones, disks, abrasives, and such polishing materials as will give the highest glaze and most brilliant sheen possible. This work should be undertaken before the pyorrhea pocket itself is disturbed, for the very simple reason that, if pumice or fine silex is used in polishing the teeth, this material will find its way into the pyorrhea pockets that have been opened up by instrumentation. The presence in the pockets of insoluble particles of silex or pumice causes additional irritation to those tissues; hence the advisability of doing the polishing of the enamel surfaces before operative procedure is commenced on the tissues of the root. The disclosing stain should be used both before and after the tooth surface is polished;—before, to guide the operator to the points which need polishing most; after, to check up the result, because the etched surfaces and bacterial growth on the tooth surface are so transparent and elusive that the operator, even after what may seem to him a very satisfactory polishing, may attain very poor results, because of the great difficulty in removing all traces of the bacterial coat.

MINUTE ANATOMY OF THE ROOT OF A TOOTH.

After this phase of treatment has been completed and the mouth and gums have been thoroughly freed of the polishing material by flushing them with water, the operator should begin the treatment of the root surface, a study of which surface is exceedingly important as a prerequisite to successful treatment. We are accustomed to think of the roots of teeth as being composed of pulp, dentin, and cementum, the cementum being the outer covering of the dentin, affording attachment to the fibers of the peridental membrane, which forms the joint between the tooth-root and the alveolar process. A study of the cementum itself is well worth while, and to that I now call your attention.

The cementum is composed of atypical layers of bone, with thousands upon thousands of bone cells scattered through it. These bone cells are most numerous in the deeper portion of the cementum, and they gradually become fewer in number as the external surface of the cementum is approached, until a distance of about one-fiftieth of an inch from the external surface is reached, at which point very few bone cells are found. The small spaces which the bone cells occupy are called lacunæ, and the cells intercommunicate through channels known as canaliculi. On account of the necessity for a firm layer of attachment for the suspension of the tooth in its socket and the formation of the joint between the root surface and alveolar process, nature has built a denser portion of bone in which are very few lacunæ at most, and usually none at all. This denser portion of external surface, which, as I have said, is at most not over one-fiftieth of an inch thick, does not occur as a distinct layer clearly outlined as something that could be dissected up and stripped off, but is merely a denser layer of bone of exactly the same kind as that which composes

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the whole cemental structure. This denser portion varies in thickness in different parts of the root, but is a constant feature in the root structure wherever one may chance to examine it. External to the dense layer, the porous layer varies in depth and in porosity at different parts of the root, but it also is a constant feature of cemental structure.

SURGICAL TREATMENT OF THE ROOT SURFACE.

The aim of the operator in this type of root-surface surgery should be to cut away from the root all evidence of this outer rough coat, in which the suspensory ligament of the joint has its insertion, and he should attempt to do this in such a way as to leave a brilliant, gleaming, polished surface. When once he has uncovered that surface, he should stop instantly, lest he cut through the denser layer of the cementum, and expose to subsequent infection bone cells in the underlying spongy portion of the cementum. The enamel surface and the cemental surface of the tooth are the only two areas in the whole physical economy which lack the protective activity of the leucocytes. There being no leucocytes in the saliva, the enamel surface must be protected from bacterial growth in one of two ways: First, by mechanical means through mastication, or second, by polishing by the patient himself or by the dentist. The only other way in which the enamel surface can be protected is by establishing immunity to bacterial growth, and this is the great problem which now confronts dentists the world over. Is it possible by a known method of diet or therapy to produce such a condition of immunity as will inhibit the growth of bacteria on the oral surfaces?

THE PROBLEM OF IMMUNITY.

Our knowledge of immunity at the present time has not advanced to such a state of perfection as to crystallize any known method of bringing about immunity to bacterial growth in the mouth and alimentary tract. So we can dismiss that phase in the present discussion, and simply say in passing that that part of the problem must be studied with an ever-increasing interest by our profession, if we are to make real and lasting progress.

CAUSE FOR FAILURE OF MEDICINAL TREATMENT.

I said a moment ago that the leucocytes offered no protection to the root surface, and it is on this account that all kinds of medication directed toward the inhibition of infections in pyorrhea pockets must, in the end, fail. However much good such medicaments may do for the moment, the root surface is soon reinfected, because the leucocytes do not pass out of the tissue to do their best work, and the porous inequalities of the root surface offer an undisturbed culture-bed in which bacteria procreate in infinite numbers, ever supplied with food material from the blood-stream and saliva, but out of reach of the activity of the leucocytes. It is because of this fact that it is necessary actually to skin the root surface. The author thoroughly understands that the so-called scaling of the root surface has been advocated for generations, but this scaling is not enough. One must actually plane off the infected porous coat with the putrescent remains of the ligament of attachment, if he would prevent reinfection of the root surface, and he must do this skinning operation in such a way that he will not

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open up the still more porous substance of the deeper portion of the cementum.

TYPE OF INSTRUMENTS TO BE USED IN SURGICAL ROOT-SURFACE TREATMENT.

To accomplish this operation in the best manner without cutting too deeply, thus causing harm, one should have instruments so constructed as to render it impossible to take off more than a thin layer at any one stroke, and these instruments should be so sharp that they may be very lightly held in the fingers of the operator. Each one should be so constructed as to contribute steadiness and accuracy by its form, therefore all instruments for this work should be in effect straight instruments. First, they should have their cutting-edges exactly in line with the center of the handle, no matter what curvature of the shank may be necessary for reaching otherwise inaccessible positions on the root; second, each instrument should have two points of contact with the root surface, the cutting-edge and as broad a point of contact on the root surface mesial to the cutting-edge as it is possible to attain; third, the cutting-edge should be sharpened at nearly a right angle, to allow of push-and-pull movement, as advocated by Gartrell, James, and others. The observation of these three requirements make for accuracy and perfection of movement, and if these principles have been observed in the creation of the instruments for this work, the operator is able to gain more perfect results than he otherwise could gain by haphazard operation with instruments of haphazard construction.

THE IMPORTANCE OF A LIGHT GRASP OF AN INSTRUMENT.

The most difficult thing we have to overcome in teaching instrumentation in root-planing is the disposition of the operator to hold the instrument very tightly and strongly in his hand, and to bear down too hard on the cutting-edge. Blades should, as I have said, be sharpened at almost a right angle, so that bearing down cannot drive the cutting-edge into the tooth. Excessive bearing down robs the operator of delicacy of tactile perception, therefore he should hold the blade just as loosely in his fingers as he can and still make the planing movement. He should remember that the blade is intended to rest on two points, the cutting-edge and that portion of the shaft between the cutting-edge and the hand, which we might call the plane head. The instrument will not cut unless it rests on these two points. The fact that the instrument has two contacts makes for steadiness and accuracy in planing, and is an exceedingly important feature. Another reason for light grasp of the instrument is that one can distinguish between the different types of material with which the blade comes in contact. If the instrument is held very lightly in the hand, the shaving of tooth substance or of calculus differs in the sensation conveyed to the operator sufficiently to inform him what he is cutting—for it is to be remembered that too deep cutting means reinfection, which increases sensitiveness.

SENSATIONS TO BE GAINED DURING INSTRUMENTATION.

This is the practical reason for insistance on a light, delicate grasp of the instrument and a very discriminating sense of touch, because there are five distinct sensations which may be gained from the movement of the cutting-edge of the instrument on the tooth surface. First, there is the more or less jelly-like feeling which one gets when touching

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peridental membrane fibers without calculus; second, there is the rough, gritty feeling which calculus produces; third, there is the sensation—quite distinct from either of the first two—which the plane gives when cutting the porous root surface after peridental fiber and calculus are removed; fourth, there is the smooth, velvet-like feeling which the sharp plane affords when it has arrived on the hard layer of the cementum; fifth, there is the sensation noticed after one has been cutting on this hard surface for a few moments, a sensation due to the chattering of the blade in the spongy structure of the atypical bone of the body of the cementum. This is a sensation which the operator should never let occur, and which will not occur if he will stop when he meets the velvet-like smoothness in the hard layer which results from perfect operation. It follows as a matter of course that one needs instruments adapted to the surfaces; curved planeheads for convex and concave surfaces, and blades of varying length and breadth —all systematically arranged to facilitate speed and to avoid confusion.

In choosing my instruments for my clinical work, I am guided by two considerations—by the fact that the root surface is to be regarded as a weight to be moved, and by the fact that the handle of the instrument is to be regarded as a lever.

TECHNIQUE OF OPERATING.

In regard to the operative work itself, one should take short strokes, always keeping the wrist in line with the forearm, beginning at the gum margin and directing the instrument root tipward and around the curvature of the root, going deeper at each succeeding movement, thus clearing a path for the instrument and making the operation painless, because of the small displacement of tissue. It should be the dentist's aim to polish the enamel margins so that they may easily be kept clean. Sensitiveness is due largely to the irritating effects of acids which result from fermentation and too deep cutting.

CLASSIFICATION OF INSTRUMENTS USED.

The instruments which I use in my clinic number one hundred and forty-four, and they are classified in four ways. They are first divided into eighteen groups of eight. This division is based on the position of the surfaces to be planed in relation to the finger-rest of the operator. Each one of the eight planes is made to fit one of the eight divisions of a circle, or, to be still more explicit, each plane is turned on its long axis 45° from its adjoining neighbors. This enables the operator to sit facing his patient and operate from eight different aspects of any given tooth from the same finger-rest, without changing his position in relation to his patient.

A second classification divides the instruments into three groups of forty-eight each. One group is intended for planing straight or flat surfaces, one for planing convex, and one for planing concave surfaces. This is to give the operator a selection which will fit any type of root surface, as it is impossible to plane a concave area with a flat or convex instrument.

A third classification divides the instruments into two great classes, one with a large offset or angle in the shaft, to reach far back into the mouth without stretching the corners of the mouth, and another to permit operation in the anterior portion of the mouth, in which

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case the curvature or bend of the shank more nearly approximates a straight line.

A fourth classification divides the instruments again into three groups of forty-eight—long, medium, and short, or large, medium, and small. These different classifications afford the operator instruments for every conceivable type of surface, except V-shaped angles, such as we find at the bifurcation of roots.

NECESSITY FOR SHARP INSTRUMENT EDGES.

Next in importance to the necessity for having an instrument at one's hand for every conceivable type of root surface and depth of pocket is the necessity for extremely sharp edges on the instrument. Such keen and sharp edges are speedily gained by the proper use of a sharpening device which makes the maintenance of a proper edge automatic.

REGENERATING LOST ALVEOLAR PROCESS.

Assuming for the moment that by our course of treatment we have cared for the enamel and the root surfaces, the problem which now presents itself is that of the loss of the alveolar process. The experience of the great majority of operators tends to create in their mind the idea that the alveolar process is not and cannot be restored when once lost. However, these conclusions are based on experience which has not taken into consideration the physiological requirements for the development of new bone, and on the hypothesis that bone is produced from periosteum, an erroneous belief. Since the wonderful laboratory experiments of Macewan of Glasgow, we have been taught that bone does not grow from periosteum, but rather from pre-existing bone cells; therefore the problem is to bring about the proper conditions for the reproduction of bone. The conditions are asepsis, freedom from pressure, and the freshening of the bony surfaces from which production must occur. This, I will admit, is a difficult combination of conditions to bring about in the mouth, but in just the proportion we can bring them about we can have deposit of new bone around the roots of the teeth upon which we have operated. The problem is, How can we best satisfy these conditions? The plan followed by the author in his attempt to provide the proper conditions for bony growth consists, on completion of the operation of skinning the root surface, in freshening the margins of the existing process by light curetment, which, of course, is followed by profuse bleeding. The next step is to seal the margin of the gum to the root by a suitable dressing material. If the blood-clot which flows up into the space formerly occupied by the ligament of suspension and alveolar process can be maintained in that triangular area for even a few hours, the bone will actively produce new bone cells during such period of time. If the period of time can be extended from days to weeks, the outpour of new bone will continue as long as freedom from pressure on the uplifting bone and asepsis obtain. The blood-clot is the best provisional filler of the space formerly occupied by bone and ligament of suspension. It has a certain anti-bacterial quality, and it exerts no opposition or resistance to the outpour of new bone cells from the process margin. The author is convinced by repeated experiment and observation that new bone can be and is produced about the roots of teeth to a considerable degree. It is probably true that we can never expect to have the original outlines of the pro-

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cess reproduced, but it is certainly true that enough outpour of new bone occurs about the roots of teeth which have lost a portion of their alveolar support to vastly increase their mobility and resistance to stress—an occurrence that would have been deemed impossible five years ago.

SEALING SOLUTIONS FOR GINGIVAL MARGIN.

The matter of a proper material with which to join the gingival margin to the root surface affords a field for experiment. At the present time, the writer is using two materials. One is sandarac varnish, which is applied to the tooth surface and gum after drying with the air-blast. This varnish will be retained for some time, thus closing the pocket to the fluids of the mouth. A still better material for closing the pocket is a combination of creasote and iodin, which is applied to the tooth surface and gum margin. This is allowed to dry-in for a moment, when it is followed by a coating of a saturated solution of tannic acid in glycerin, as advocated by Adair. This dressing will stay from twenty-four to forty-eight hours. The author has repeated the application at intervals of from two to four days, first thoroughly cleansing the necks of the teeth with hydrogen dioxid, lightly stirring the new granulation tissue piling up around the tooth root, just enough to cause bleeding, and then reapplying the sealing solutions. Under the conditions produced by this procedure, a surprising amount of new bone will be gained, and the teeth rendered much more solid in their sockets than by any other method of procedure known to the writer.

POST-OPERATIVE TREATMENT OF THE TEETH.

The post-operative treatment of this condition consists in gaining and maintaining, as nearly as possible, freedom from bacterial flora on the tooth surfaces. This end may be attained through the regular use of the revealing stain, which enables the patient to see where the bacterial coat is accumulating, and, subsequent to the operative treatment, to remove from the root surfaces, by proper use of the tooth-brush, wood points in a holder, and floss silk, any bacterial coat which the revealing stain may show to be present.

The next thought in post-operative treatment is apt to arise from the fact that many of the teeth are hypersensitive to heat and cold after the root surfaces have been skinned. This can often be controlled by drying into them saturated solution of silver nitrate applied with wood points in the holder, rubbing this solution in as vigorously as possible and keeping the warm-air blast playing over the surface when the application is made. When the sensitiveness grows less from day to day nothing further need be done, but when the sensitiveness to heat and cold is cumulative, pulp removal and canal-filling must be resorted to, the work to be done under nitrous oxid anesthesia or interosseous anesthesia, as the operator may elect.

CARE OF THE SOFT TISSUES IN AFTER-TREATMENT.

The next problem which presents itself to the operator is the care of the soft tissues. Assuming that a sufficient length of time has elapsed since the be-

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ginning of the operation to permit the deposit of the maximum amount of bony material around the roots of the teeth, it is then advisable to attempt to improve the tonicity of the mucous membrane of the gingivæ. This is best accomplished by massage. In this connection the author has used a variety of medicaments. Among the earlier drugs used for this purpose was that recommended by Dr. Smith of Philadelphia, a proprietary preparation, but a very useful one. Sulfo-carbolate, in a 10 per cent. aqueous solution, was experimented with, and is still used with great benefit in certain types of cases. The tannin, alcohol, and glycerin compound, a proprietary remedy made under the name of Azone* has been by far the most useful of any of these remedies. A two per cent. salt solution in hot water followed by 70 per cent. alcohol in water is excellent. Whatever solution is used should be massaged into the gums with a cotton roll held in a hemostat, or Kuroris. The whole purpose of these measures is to stimulate the development of a dense gum membrane, and to cause the gingivæ to shrink tightly to the necks of the teeth; and for this very reason, this method of treatment should not be adopted until all possibility of bony uplift is passed, for shrinkage of the overlying tissues checks the outpour of new bone. When the labial or buccal and lingual levels of the process are high, and the process between the roots of teeth has been destroyed, it is possible to bring about, by such perfect operative procedure, a condition of asepsis which will permit nature to fill entirely the crevices between the roots, which crevices may be as deep as a quarter of an inch. The leucocytes poured out into these spaces are the provisional filler thereof, and subsequently organize into connective tissue. Moreover, the labial and lingual mucous membrane will bridge across such masses of granulation tissue, and cover and protect these areas which otherwise would remain open for the ingress of food materials and infection.

* Azone = alcohol, glycerin, decoction of red oak-bark, equal parts.

In a future paper I hope to deal with the following problems. First—

DANGER OF BREAKING DOWN TOO FAST THE GRANULATION TISSUES AROUND INFECTED TEETH.

An important thought in the operative treatment of pyorrhea is one which has been impressed upon the author by repeated misfortune, viz, that it is unwise to disturb more than two or three teeth at a sitting, on account of the fact that the wall of granulation tissue which hedges in pyorrheal infections is broken down through the effort to free the root surface of its infection. When the wall of granulation is thus broken down, large numbers of bacteria are introduced directly into the circulation. If only two or three teeth are disturbed, the individual can absorb and destroy the dose. If, however, through the anxiety of the patient to have his work rapidly completed, a large area involving six or eight teeth is disturbed, the patient is liable to have a pneumonia supervene, or an active joint infection, or an acute nephritis, or he may have a sharp chill and considerable temperature for two or three days. Having noticed examples of each of these four types of post-operative disturbance described, the author limits the area treated in any one mouth to two or three teeth at one sitting.

In line with the thought just discussed

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is another bearing on the same question. The writer also forbears attempting to stamp out a mouth infection immediately preceding a grave surgical operation in other parts of the body. He prefers to have the mouth operated on from ten days to two weeks before subsequent surgical interference is necessary; for the patient is more liable to harm on account of the breaking-down of the wall of granulation tissue, which has existed for perhaps years, and which is the one factor which has prevented a pneumonia, a joint infection, or a septicemia, any one of which serious disturbances may follow after this protective wall of leucocytes is broken down. During the skinning of the root surface the patient may have absorbed a sufficient amount of bacteria to so weaken his resistance as to react very poorly under the added stress of a grave surgical operation; whereas, if sufficient length of time elapses for healing to have occurred before subsequent operation takes place, the patient is in a very much better condition to resist a serious operation in other parts of the body. The importance of splinting teeth which have lost so much bone that there is not enough left to hold them rigidly after infection is stamped out should be considered.

The second problem is—

AFTER-TREATMENT OF LOOSE TEETH, AND WHY TEETH LOOSEN.

Teeth loosen from two causes, the swelling of the ligament of suspension heaving them up in their sockets, and the actual loss of the process. Teeth often are very loose although they have ample bone to hold them. After the operation of root-skinning is successfully accomplished, this type of tooth regains its rigidity in a marked degree in from twenty-four to forty-eight hours. If, however, much bone has been lost, no matter how successful the operation of root-skinning may be in stamping out infection, the tooth remains loose. It then becomes a matter of judgment as to whether these loose teeth shall be retained for any further service. If they can be supplied with some artificial means of support which will prevent lateral movement in their sockets, they will, as a rule, bear all of the weight of mastication without complaint. Therefore the construction of suitable splints or bridges of a removable character, which will afford mutual support to these teeth and prevent lateral movement, is a most successful form of treatment.

Diet is of the greatest importance. Alcohol, tobacco, and heavy meats should be eliminated. Citrous fruits and vegetables should be used, and starches should never be mixed; one starch is enough at a meal. The patient should eat generously of few elements and gain variety by different menus, rather than by many foods at a single meal, and should consume at least two quarts of pure water in every twenty-four hours. The patient should also sleep out of doors, or in a well-ventilated room, and take reasonable exercise.

The third problem is that of—

VACCINE THERAPY.

Vaccines are needed only when recurrence occurs in a clean mouth or when the patient's resistance is extremely low, and then only when such tonics as peptomangan fortified by strychnia and iron (Blaud's pills), or phosphorus have failed, or when a joint-infection will not yield after the initial focus in the mouth has been eliminated, at which juncture an autogenous vaccine is indicated. Viable lactic acid bacilli, also, are of great service in this connection.

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DISCUSSION.

Dr. R. H. Hofheinz, Rochester. To discuss pyorrhea alveolaris from any standpoint seems almost hopeless. I am more and more convinced that, whenever one has to vent an opinion on the writings of others, unless this be done with a certain one-sided enthusiasm or with a loving interest in the writer and the work, the result is hardly worth while. The most difficult task is presented to the debater when he is asked to discuss not only a paper or essay, but an elaborate lecture such as has been presented to us by Dr. Hartzell.

In reading some of the writings of Dr. Hartzell on this subject, I find that he is of the opinion that the pathology of the jaws and teeth have received little consideration. In this statement I differ with him; there is possibly no dental subject which has received more intelligent attention than the pathology of the jaws and teeth. The dental profession has never received a greater compliment than that which was paid to it by one of the famous Mayo brothers, who, at Chicago, read a paper on pyorrhea in its relation to systemic diseases. The indefatigable work of such men as our essayist, Dr. Rhein, and others, has compelled the medical world to recognize the importance of dental lesions in relation to general disease.

Dr. Hartzell laid great stress on the eradication of infection by not producing or at least not increasing raw surfaces, and thus establishing an abnormal condition. This is a cardinal point. It is a rather difficult question to establish what we call normality. Normality, after all, can only refer to a group, and not to the entire race. What may be normal in one mouth is abnormal in another. Look at the mouth of dogs after biting bones—a process which must leave raw surfaces of the gums, and yet infection does not necessarily follow. The tooth-brush, for instance, is neither a provision nor a product of nature, and its use renders oral conditions supernormal. What state would mouths be in, however, without its use? We are paying the price for our higher state of civilization and higher living.

The very bacteria which Dr. Hartzell has found in pyorrheal pockets are, according to Miller, frequently present in the normal oral cavity. In his famous book, "Micro-organisms of the Human Mouth," he says that in the course of a few years hundreds of kinds of bacteria would become established in the mouth if the majority of them did not perish, sooner or later, in the struggle for existence. To what extent bacteria are a cause or result of pyorrhea still remains a question. Pathogenic organisms are remarkably well taken care of at the extremities of the alimentary canal. If it were not for these compensating agencies we would all be dead long ago.

At the beginning of this paper, the essayist says that operative treatment of pyorrhea was firmly established, but no crystallized method of practice had yet been in use. The treatment of pyorrhea seems more or less a dental specialty. I listened to a suffragette's speech a few evenings ago; she said that she disliked nothing more than a wabbling

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woman. I say the same of a practitioner, and above all of a teacher. During the years of my teaching I occasionally found it better to fit a case to the argument than to allow an assertion to stand on weak legs.

The essayist tells us that one of the most important essentials in surgery is to have a clear conception of the underlying philosophy. It seems to me less a question of philosophy than of science, and in this particular instance, of technique.

Pickerill, as Dr. Hartzell mentions, has convinced us that normal enamel is not smooth. The previous studies of Leon Williams, and I believe of Black, have shown us that smoothness of the enamel is not a normal condition. Its corrugated surface is a product of growth. Growth is an interrupted process, one of the best examples of which is the clam.

The essayist speaks of skinning the root, but skinning the enamel is another question. In the former instance we take off diseased tissue, but in the case of enamel we remove healthy tissue. Though it may be easier to keep off deposits and bacterial plaques from a smooth enamel surface in case of disease, rugged enamel is but an incident and not a cause. Corrugated enamel surfaces are normal in health, though they may become abnormal in pyorrhea. Both before and after treatment the interproximal space and gingival line will always remain the hotbed for bacterial accumulation. The starting-point of the *disease*—meaning the real change from a physiological to a pathological condition—remains the peridental membrane.

Many years ago I quoted a case of replantation in pyorrhea. Though this disease had affected practically every other tooth within a short time, the replanted tooth remained sound until the natural causes of absorption expelled it from the human economy.

I strongly agree with Dr. Hartzell in condemning the application of pumice in pyorrhea pockets. If used, however, it should be followed by an injection of hydrogen dioxid, or, what I consider still better, a ten per cent. solution of lactic acid and a saturated solution of sodium bicarbonate.

The absence of leucocytes in the pericementum is mentioned by the essayist as a factor that greatly favors bacterial proliferation. I beg to advance one step farther. We may find leucocytes in the cementum where the vessels are large enough to carry them, and that is particularly the case at the tip of the root. Death and destruction of the pericementum, therefore, means absence of leucocytes in the cementum. Skinning of the root is certainly a very original expression, which the pyorrhea specialist should not forget.

There are very few dental practitioners who can make a correct digital diagnosis. Fingers that work with rubber files and inlay casting apparatus are not the ones to detect and determine the different stages which Dr. Hartzell enumerates. A special digital education is necessary. This reminds me of what Oliver W. Holmes told a mother when she asked him at what time a child's education should begin: "One hundred and fifty years before it is born."

It is an acknowledged fact that the most skilful workman uses the finest instruments. Whether this can be applied to the operative treatment of roots, I doubt very much. Every unnecessary injury to the tissues is in itself an aggravation, and may lead to exacerbated

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pathologic conditions. Though the former doctrine of the periosteum being necessary for bone formation has been exploded, as we have been told, the periosteum still remains a medium for vascular supply. It is, therefore, very essential that the operator be well prepared with the proper instruments and have the fitting touch.

I am in almost full accord with the essayist's remarks regarding the technique of skinning the root. I also agree with him that it is unwise to disturb all teeth at the same sitting, thus crippling the entire denture. It is much like the tumor which the late Dr. Morton was asked to remove from a negro's neck. He said, "I could have taken it out at one time, but there would have been no negro left."

Vaccines seem to be still too much in the experimental stage to be accepted as a sure means of cure. If ever they prove so, I sincerely hope our colleague will sell for less than our beloved German friend, Friedmann, sold his turtle product.

I need not dwell on the splintering of loose teeth; it seems too natural. Any serviceable, even if crippled, organ should be retained. A club-foot is better than a wooden leg, a loose tooth is better than none.

Dr. Hartzell says in his paper, "Teeth often are very loose although they have ample bone to hold them. After the operation of root-skinning is successfully accomplished, this type of tooth regains its rigidity in a marked degree in from twenty-four to forty-eight hours." I have seen quite a number of such teeth regain their rigidity even without root-skinning. This class of pyorrhea is more frequently associated with constitutional causes than any other. This, however, might lead us to an endless discussion. Though the essayist did not dwell on this subject with great emphasis, he has in his previous writings expressed himself very clearly. In one of his papers he says: "I restrict the constitutional causes (1) to excessive use of mercury in syphilis, (2) to lead poisoning, (3) to a large and persistent increase of urea in the daily production of urine." I somewhat disagree with this statement of my learned friend. In the first two instances we have specific pyorrhea; the third phenomenon enumerated makes its appearance frequently in connection with rheumatism, gout, etc. I believe that any faulty metabolism, any disease that lowers the tonicity of the system, will in time act on the delicately constructed peridental membrane, and thus predispose to pyorrhea. Long ago I accepted and I still adhere to the view of Miller and others that three factors are always to be considered (1) predisposition, (2) local irritation, (3) bacteria. As a predisposing cause we must consider any disease that reduces the resistance of the tissues involved in pyorrhea, some acting with greater virulence than others.

Miller mentions one in which, three weeks after the teeth had begun to loosen, all upper incisors were hopelessly lost. He mentions no special cause, but the disease certainly was not of local origin.

A patient of mine presented himself some four weeks ago with all of his anterior teeth alarmingly loose, with plenty of bone surrounding them. "What is your internal trouble?" was my first question. "Eight per cent. of sugar." "Eliminate the sugar, and in two weeks we will start the local treatment." At the appointed time, though

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the local condition was not perfect, I found the teeth normally tight. "How much sugar?" I inquired. "Not any;—but do you know what tightened my teeth? Alcohol did it; my sister's dentist recommended it." Sweet innocence! I felt a tendency toward anger, but instead thought of Carlyle, to whom someone brought the news that Margaret Fuller had agreed to accept the Universe. Carlyle's only comment was, "'Gad, she'd better."

Such papers as we have listened to induce us to regard pyorrhea as a curable disease. And, though there are instances where all scaling may prove futile, almost all cases can be bettered if treated in such a scientifically skilful manner as Dr. Hartzell recommended to us today.

Dr. W. S. Lewis, Brooklyn. It is a cause of great satisfaction to me that I have been permitted to meet Dr. Hartzell, to hear him read his paper, and to take part in this discussion. I have read other writings of Dr. Hartzell's on this subject, but, in the paper under discussion he has given us in riper form the best of all his other writings—has given us what may be styled an "up-to-the-minute" paper on this subject. This paper could not have been written a decade ago, and it bears witness to the great advance that has been made in dental science, and especially in the treatment of pyorrhea alveolaris, during the last few years.

Most papers dealing with this subject have been to me more or less unsatisfactory in that they were written, in a greater or lesser degree, in general terms, and discussed different hypotheses at length, but have not, like our essayist's paper, suggested a definite and crystallized mode of treatment, nor explained, like the essayist, step by step a perfected and finished technique.

In our profession there is today a vast difference of opinion on the subject of the treatment of pyorrhea. There are still those—and their number is not small—who hold that very little, if anything, can be done to ameliorate this condition. There are others who hold the belief that a cure can be effected. There are those who operate with one or two pet instruments, and claim that, with these, all the scaling possible can be done. There are others who insist that the scaling shall be done with a pushing motion, and that the root surface should afterward be smoothed with files, if necessary. There are those who treat almost entirely with vaccines, and others who pin their faith on some particular dentifrice, mouth-wash, or other form of medication.

I can discuss this paper not from the standpoint of the specialist in pyorrhea alveolaris, but from the angle of view of a general practitioner of dentistry who has taken a deep interest in the subject, and who for years was groping in the dark and trying to find the light. As such, Dr. Hartzell's paper specially appeals to me, as he suggests a definite mode of treatment which, if mastered and followed faithfully, will enable us to give great aid and comfort to patients suffering from pyorrhea.

I am heartily in accord with most of the essayist's statements. I became a convert to the idea of planing the root-surface, as advocated by Drs. Hartzell, James, Buckley, Carr, Tracy, and others, several years ago, and although I know many skilful operators who use other methods and produce beautiful results, I found that for my purpose the system of planes was what I had been looking

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for, and that with them I could attain to results that had been before out of my reach.

I am much impressed with our essayist's method of treating the crowns of the teeth first; this has not been my usual technique, but Dr. Hartzell's logic seems good. It is undoubtedly true that roughened enamel margins and etched enamel surfaces, with their adhering bacterial growths, keep the gingivæ in a state of inflammation, unless they are absolutely smoothed and polished.

In speaking of the structure of the cementum, our essayist contends that the outer roughened layer to which the ligament of suspension is attached must be planed away. This is a most important feature, and can, I believe, be accomplished with more certainty by the use of planes than by any form of scalers or files. Once the pericemental fibers are separated from their cemental attachment by acute inflammation, they become necrotic and must be removed absolutely. We must not hope that upon the removal of deposits the pericementum will re-attach itself to the cemental surface, for the teaching of Black and others has shown that this cannot take place. Our aim, therefore, should be to remove all pathologic tissue, and if this be done the space will be filled in with new osseous and connective tissue. In all cases where there has not been too much loss of tissue before operating, the tooth thus treated will be held firmly in position once more.

Hypersensitiveness of teeth after operating is one annoying feature which appears after some months. I believe that over-instrumentation is the chief cause of this condition. Silver nitrate is very efficacious in the treatment of this condition, but it is open to the serious objection that it stains the root surface. I have found that from 50 to 100 per cent. zinc chlorid, also 50 per cent. formalin, will control a large percentage of the hypersensitiveness met with. These medicaments should be applied and vigorously burnished into the root surface, the warm-air blast being applied at the same time and the burnishers warmed somewhat.

I have not met with any great degree of success in attempting to seal the pocket after operating, but it has been my habit to fill all deep pockets with bismuth paste. I realize, however, the desirability of the procedure suggested, and, as our essayist tells us that it can be done successfully, I will try again.

In the after-treatment of the soft tissues I do not believe in any long-continued medication, having found that only for a time will such treatment restore the tonicity of the tissues; that if it be continued they fail to react to it, and in fact lose tone. Proper massage of the gums with suitable brushes—the patient to be impressed with the necessity of brushing the gums rather than the teeth—will do more to sustain the tone of the tissues than gallons of medicaments.

The problem of establishing immunity to bacterial growth is the greatest of all the problems which confront the dental profession today. Pickerill's careful investigations have brought to light many interesting facts, and his deductions deserve the most careful consideration. The hypotheses which he presents and the methods of treatment which he advocates have not been before the profession for a long enough time, nor have they been given enough publicity as yet for us to pass judgment on them, but

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to me his investigations are especially interesting in that they seem to link together immunity to bacterial growth in the mouth, immunity to caries, and immunity to the deposition of calculus. If Pickerill is correct, we shall by further research be able to control all these factors to a greater or lesser degree.

In closing I wish to impress on you that the essayist has given us a crystallized, practical method of treatment, which he has carefully explained step by step, and which he will elucidate still further by his clinic. From what I hear, Dr. Hartzell is successful in his work—he obtains results, and his description of his technique should be an incentive to us to go and do likewise.

Dr. F. W. Low, Buffalo. After a very pleasant visit to Dr. Black in Chicago last winter, I have come to believe that for the majority of patients we might add to the treatment, and put them on half rations. Dr. Black demonstrated to my satisfaction that in his own case, in regard to the particular diet which he used for a number of weeks, it did not make so much difference what he ate, as the amount. He proved that the deposits and re-deposits were always excessive unless his regular diet was reduced in quantity to about one-half.

Dr. H. T. STEWART, New Orleans, La. I would not have spoken tonight at all except for the fact that this admirable paper is upon a subject in which I have been particularly interested for the whole of my professional life—the last twelve years having been practically devoted to it. I wish to thank Dr. Hartzell for his paper, and to say that I wish we had in the profession in the United States one hundred men who would give their time to this work and do it as earnestly as he has done it.

A serious drawback, perhaps, in the advancement of this particular work is the disposition to criticize little details, instead of dwelling on the good work a man has done. While there are one or two items in the paper to which I would like to refer, I do not disagree with him, but simply differ with him.

As to the set of instruments which he has designed for this special work, especially for planing the root surfaces, I believe I have the honor of having presented this idea to the profession before anyone else. Fourteen years ago, in New York City, I read a paper before the Odontological Society in which I advocated the removal of the external layer of the cementum in the treatment of Riggs' disease, in a paper entitled, as I remember it, "Partial Removal and Decalcification of the External Layer of the Cementum."

Dr. Hartzell mentioned one point on which I would like to lay special stress, and that was as to curetting the margins of the bone. This curetment is often overdone. I simply wish to call attention to that point.

As to the closing of the pocket, you know that whatever be the method we employ, if we have success—whether our success is on account of the method or in spite of it—we are inclined to think, That is *the* method! Years ago I endeavored to close pockets after operating. My father, who was also a dentist, used for that purpose an almost saturated solution of tannic acid in glycerin, and later on a syrupy solution of tannin in tincture of iodin. I have tried a good many preparations, among them one advocated by Dr. Kirk, and I got

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results just as I got results in the treatment fourteen years ago by purely local measures. At that time I contended that the disease was a purely local one. I also said that all removable appliances of every description should be wholly condemned. On both of these questions I have changed my mind entirely. I find that I get better results in the end by not closing the pockets and leaving nature to herself.

As to the question of acids: Years ago in my own malarial district I noticed that people who were in the habit of taking, especially in the spring and summer, large quantities of lemon-juice in water, and those who lived largely on fruit, had a better condition of the mouth than others who did not. This was contrary to my teachings and ideas, but facts are stubborn things, and several years ago I began to prescribe, in certain conditions, lemon-juice in water as a mouth-wash, and I have never had occasion to regret it.

As to the instruments used by the essayist, Dr. Hartzell has certainly devised a beautiful and doubtless very useful set of instruments, but for my own part, my individual skill was developed along certain lines before those instruments were devised, and I believe I can produce better results with my own comparatively few instruments. I employ probably only eight or nine to do at least seventy-five per cent. of my operating, although I have many instruments for particular operations and for certain locations. Dr. Hartzell probably could not do so well with mine, and I could not do so well with his.

I have a word to say as to splints. This was brought to my mind by one of the pictures shown. I believe that a splint should nearly always be removable, and in the clinic I will give tomorrow I intend to show both fixed and removable splints, and why each individual tooth should at some time have individual motion, and therefore that our bridge work should be constructed with that idea in view, and so that when the piece is removed for brushing the teeth, each tooth can have individual motion. Of course the bridge acts as a splint while in place, but, in removing it, brushing gives to each tooth a slight exercise and movement in all directions in its socket.

Dr. M. L. RHEIN, New York. I would like very much to emphasize the point in Dr. Hartzell's paper with regard to the need of a pathological sense in dentistry. The great difficulty in discussing such subjects before a dental meeting is the impossibility of having the major portion of your audience appreciate the pathological conditions you are trying to elucidate.

We have listened to a magnificent, detailed, up-to-date technique in the treatment of pyorrhea, but I do not care to go into this phase of the paper because I am in most hearty accord with the essayist. I would like, however, to refer to a point in Dr. Stewart's discussion of the paper. Dr. Stewart said that he formerly advocated fixed splints, but that now he was entirely opposed to any form of splint except a removable one.

Dr. STEWART. My statement was not so positive as that. I did not mean that under no circumstances should we use fixed splints, but I meant that on general principles we should not.

Dr. RHEIN. If that is the case I agree very heartily with Dr. Stewart, because I believe there are cases where there is an insufficient amount of alve-

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olus left to make a removable fixture practicable, and in many of those cases the usefulness and health of these teeth cannot be restored unless absolute fixation be resorted to. Recognizing the fact that such cases do exist, then I most heartily agree with the view presented both by the essayist and by Dr. Stewart, that not only is the fixed bridge to be avoided as a rule, but that fixed bridges are one of the most frequent sources of trouble with which we have to contend in pyorrhetic conditions.

When we analyze this subject thoroughly we cannot fail to be impressed by the fact that there are two factors lacking in the present-day dental curriculum, making this subject such a difficult one for the dental practitioner. The most important is the lack of instruction in diagnosis in the dental school—in every dental school, more or less; and it is impossible to correct this unless the entire curriculum is changed, because it is impossible to teach diagnosis when the teaching of pathology is confined to a portion of the body. Until the time arrives when the dental student is as familiar with every part of the body as he is with the parts in which he is being instructed, it will be impossible to convey to him the diagnostic sense which is so essential in order to handle this subject intelligently. Treatment cannot be properly pursued until an accurate diagnosis is made, consequently the lack of a diagnostic sense is so closely related to the lack of a pathological sense that they cannot be separated, and that is the one reason, from my point of view, why the subject remains the complex one to the average dental practitioner that it does today.

Dr. L. M. WAUGH, Buffalo. I shall not attempt to discuss the paper, but wish to refer to one or two items mentioned by the two previous speakers—that is, that we are not teaching pathology. The Institute of Dental Pedagogics realizes that the branch in the dental curriculum which needs the most attention at the present time is not that of technique, but that which has to do with function and health; so that this subject of pathology is one to which dental teachers are more awake and to which they are devoting more energy than almost any other subject. They feel that the technical branches are pretty well developed, and I believe that pathology is now coming into its own, and that our students will be given a better grounding in pathology than heretofore.

Dr. R. OTTOLENGUI, New York. I would like to ask Dr. Stewart one question. He spoke about splints, and the desirability as a general principle that they should be removable. I think I am not far from the truth when I say that some of the most difficult cases we have to deal with are those in which the lower incisors are involved, and I have been wondering, since Dr. Stewart spoke, how a removable splint could be applied to that particular part of the mouth. If the principle is right it seems to me that it should be applicable there, and while I have never heard of it, such splints may have been made in such cases. I would like to ask Dr. Stewart if he would make a removable splint for the four anterior teeth.

Dr. STEWART. Dr. Ottolengui seems to have assumed that I *must* splint these lower incisors. In the first place I wish to say that I think ninety-nine out of one hundred men who treat Riggs' disease attempt to save too many teeth, and that is especially true with regard

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to the lower incisors. When we first start out we are inclined to try to save every tooth that has any sort of attachment. We are greatly tempted to do so, especially as we know that is what the patient wants, and it is particularly embarrassing to the specialist to say that he must extract this or that tooth. The patient immediately says, "Dr. So-and-so could extract the tooth; I came to you to have it saved." That is what we meet with constantly, but the more I treat this trouble the more I come to extract teeth—those which are worse than useless, and especially lower incisors. Suppose we heal the tissue around the teeth and get what appears to be a healthy condition, and still have one tooth there which is acting as a foreign substance fastened in with a fixed splint—what does it do? It will set up inflammation which spreads to the adjoining teeth and sooner or later will give trouble.

I do not believe that splints should be put in in the majority of the cases where they are now used. I have been in the habit, where a splint is necessary, of putting tubes in inlays, when found possible to do so, in the incisors. It is a tedious piece of work, and difficult from an artistic and hygienic point of view, but usually this can be done so that the splint will be removable. I do not mean that we should *never* put in a fixed appliance; sometimes it may be necessary and advisable, but there are very few cases where the removable appliance cannot be made. Where you have two teeth standing together and you think they should be braced, you can insert two inlays—put an inlay in an inlay with tube and split pin—and still make a removable piece which the patient can cleanse, which will give the teeth individual motion, and will permit of the use of silk between them.

After all, it is a matter of common sense and good judgment in each individual case that is required to make a man successful in treating this disease, and he who adheres blindly to any method or appliance must certainly fail of the best results.

Dr. HARTZELL (closing the discussion). You have indeed dealt very kindly with me, and I really should not take any more of your time, but I cannot allow Dr. Stewart's remarks to go without some little comment.

Regarding the use of acids, you will recall that I tried to make the point that immediately following the scaling of the root surfaces acids increase sensitiveness, but aside from that I am in accord with his ideas. I recommend orange-juice and water before breakfast, and of dietetic measures I think that is one of the best that we can employ.

Regarding instruments, I would say, By all means use the one with which you can produce the best results. I insist on no special set of instruments; I only attempted to crystallize a method. Why? Because so many men operate without any particular method, and if you can give them one with which they can intelligently carry out the ideas they have grasped, then they are that much ahead. In teaching we must have some method or system, and the more simple the system is the more readily you can impart your ideas. So far as being wedded to any style of instrument, I would say, Use that with which you can best accomplish the object that you are endeavoring to bring about. I would only offer this suggestion in comparing the multiple with the single-bladed instruments: If you are going to use the

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multiple-bladed instruments they should be dull, because you cannot realize what you are doing with the multiple blade, and you can with the sharp single-bladed instrument. You can readily train yourself to discriminate between a variety of substances with the single blade, and I do not think this is true with the multiple-bladed instrument.

One other point I would like to comment upon. Dr. Hofheinz seems to have received the idea that I did not think there has been a great deal of pathological research done by the dental profession. What I had in mind in this regard was that the courses in dental colleges in this country are trivial, and I am prepared to back up that statement. Talk of "dental pathology"—there is no such thing as dental pathology; there is just pathology, and the man who does not recognize that, in its truest sense, is not fit to be in dentistry, because dentistry today is on the threshold of a great era which can be utilized for its uplifting, and, unless benefited by teaching, the dentist cannot but stay in the ranks of the artizan. There are individuals practicing dentistry who have given great thought to pathology, but as a profession, are we laying the proper pathological foundation in the colleges? I believe all present will agree that we are not. I hope, however, that this great state of New York—which, as we have been told today, is the leader in dental thought and knowledge—will work out in the field of pathology that which the case really demands, teaching pathology of the whole body, not of the jaws and teeth—because the man whose training has not included general pathology, in attempting to diagnose cases is almost as much at sea as though he has had no pathology. That, I think should be nailed down good and hard, and these centers of dental thought, which so much influence the rest of creation, should be willing to expend their energy in the direction in which it will do the most good.

A MEMBER. Dr. Hofheinz asked a question with regard to bifluorid of ammonium.

Dr. HARTZELL. If you do not care to use surgery on the roots, and wish to decalcify materials on the root surfaces, I think bifluorid of ammonium will do it if you keep it there long enough.

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Report of the Committee on Practice.

By W. D. TRACY, D.D.S., New York, N. Y.

DURING the past year very little has been written on the side of scientific investigation. It is therefore extremely difficult, and along some lines impossible, to get together enough subject matter to bring to the attention of this honorable body. It seems to the writer that in many instances such a repetition is a waste of valuable time which could be better devoted to other things.

The Committee on Scientific Research gives to us all that is new, and this in itself would seem sufficient for our needs.

PYORRHEA ALVEOLARIS.

Much has been written in regard to the etiology and treatment of this disease. Latterly a great deal has been accomplished in the amelioration of its destructive influences. Most of us are prepared to admit that it is a local manifestation of a constitutional disorder. From clinical experience it would seem that, in order to accomplish permanent relief for any considerable interval of time, each case should come under treatment in the incipient stage, as the loss of the gum tissue in the interproximal spaces and the surrounding bony support of the teeth are serious conditions to combat. As this is quite impossible to regulate, the disease is seen in all its destructive stages. Attention has therefore been called to the constitutional treatment as well as the local. In the gratification excited by the beneficial results obtained by the local treatment, it is possible for us to forget the constitutional. The features of treatment are—

(1) Constitutional: The correction of the eliminative processes of the body.

(2) Local: *a*, Raising the resistance of the parts involved against bacteriological invasion. This includes strict hygiene and prophylactic measures, followed by the vaccine treatment. *b*, Removal of all deposits from the surfaces of the teeth. *c*, Correction of irregularities. *d*, Systematic prophylaxis. *e*, Stimulation of the cells by the Dunlop treatment. *f*, The use of splints.

The scaling process gives relief in proportion to the thoroughness of the technique, and is a very great contributing factor in the curing of the conditions.

The vaccine treatment is valuable in raising the resistance of the tissues against the susceptibility of the action of bacteria. It probably hastens a re-

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action of the parts more quickly. This condition could be brought about through proper diet, mouth hygiene, exercise, and plenty of fresh air.

The Dunlop treatment consists of forcing ethyl borate by means of oxygen gas into the tissues. It has a decidedly stimulating effect upon the mucous membrane and the contiguous parts.

Splinting has not received the attention which it should have done. It appears to be a valuable adjunct where the teeth have lost much of their bony attachment.

ANATOMIC OCCLUSION.

The face-bow is the keynote to anatomic occlusion. It enables the operator to transfer the wax bite plates to the articulator, so that when the plaster models are in place their planes bear the same relation to the articulator's joints that the alveolar planes bear to the temporo-mandibular articulation. This is the great scientific principle involved.

SYNTHETIC CEMENT.

Great progress has been made in the manufacture of this cement. One interesting point in the synthetic cement is that while the initial setting needs an acid reaction, yet this condition may be brought about by a very much smaller percentage of acid than is used in other mineral cements.

Further, that the reaction through simple hydration can, in a measure, take the place of an acid reaction. The reaction brought about by hydration does not permit of an excess of free acid after the cement has hardened. This renders the cement much less irritating to the pulp, and would therefore lessen the dangers of exciting the cells of the pulp tissue to activity.

PREVENTIVE TREATMENT.

Perhaps the most practical if not the most scientific treatment of the oral cavity is the hygienic treatment, as a barrier against disease. A discussion of any scientific subject in dentistry today deals with cleanliness as a basal principle of success. The outcome of the propaganda of oral hygiene is beyond computation. Its value as a preventive zone against bacteria invasion will be one of the greatest in dental disease.

CHEMICAL EROSION.

The attention of the investigators should be directed toward the treatment of this dental disorder. Its destructive influences are much harder to cope with than are those of dental caries.

THE SALIVA.

The writer has been unable to get any information in regard to the deduction which will be made from the recent investigation of saliva. What little has appeared during the past year is known to all and cannot well be elaborated upon here. The Committee on Scientific Research will no doubt give us something exceedingly interesting upon saliva at this meeting. It is hoped also that the tonsil will some day be thoroughly studied as a possible contributing cause of dental disease.

ORAL SEPSIS.

The literature relating to the field of oral sepsis, during the past year, has been abundant. Its being, its causes, its effects, its reduction and eradication, have all been comprehendingly and instructively written upon; in fact, the worth and brilliancy of some of the papers on this subject have placed them on the plane of the classics.

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Not a little of the activity and excellence of the year's literary output has been inspired by the sting and pique of merited criticism passed over from members of the medical profession regarding the neglect, or carelessness, or incompetence apparent in many mouths which have been under the care of dental practitioners.

In answering these accusations the dental writers have taken an admirable stand, condemning visible malpractice and commending and pointing the way to honest, intelligent dentistry. That modern dentistry, of a certain sort, is responsible for many septicemic conditions, is not to be denied.

Even though badly neglected, the virgin mouth—that is, one which has not been raped by ill-fitting crowns and bridges whose septic roots rest in infected and necrotic surroundings—is not so dangerous a possession to its owner as the one acquired through malpractice.

The improper treatment of root-canals and its sequelæ of necrosis and suppuration, locking-in or walling-up lacunæ or cesspools of pus and infection in the alveolar process—later to be carried and distributed through the entire human body, to reinforce other pus foci in remote regions and bring about disturbing and perhaps fatal pathological changes—is to be strongly condemned.

Regarding more frequent and scenic manifestations of oral sepsis, there may be mentioned our old and constant companion, Riggs' disease—*aliases,* pyorrhea alveolaris, infectious alveolitis, and latest but not least, chronic alveolar osteomyelitis. Its etiology and cure are still the battle-ground of the "constitutionals" and "locals." When the author has the M.D. before the D.D.S., is erudite and of long experience in pathology, we shall find a great leaning toward the systemic causes and treatment; while the nimble-fingered, thoroughgoing dentist, through his complete, delicate, and patient instrumentation, finds a great percentage of his cases cured by wholly local means.

The year has abounded in excellent papers on the causes of this lesion, and treatment has covered all methods from vaccine therapy, intestinal cleansing, feeding, and Fletcherizing, to scalers, pumice, orange-wood sticks, and referring your patient to the other fellow.

The practitioners of vaccine therapy for the cure of pyorrhea are divided between the employment of autogenous and stock vaccines. As bacteriological examination of pus pockets will show many kinds of micro-organisms, while stock vaccines are pure, individual cultures, it would be necessary to have recourse to a multiple stock vaccine in order to neutralize and minimize the multiple germs found in the pockets. The autogenous vaccines are manifestly more efficient, for even identical germs obtained from other sources fail to give the beneficial results which those taken from the case in hand do. The care, competence, and experience necessary to prepare the autogenous virus does not obtain in many offices, and anything less than a perfect preparation is dangerous to use. Therefore, etc.

The recent treatment of pyorrheal cases by the injection of a vapor or gas under and into the free margin of the gum, and which passes into the weakened and diseased arterioles, revivifying the glandular and circulatory apparatus of the part, seems to offer one more efficient method of attacking these cases of oral sepsis.

The pendulum has swung so far to

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the left during the year, that septic conditions of the oral cavity have been accused, either as principal or accessory, of disturbing or unbalancing nearly every organ or function in the body, infecting everything on the way from alopecia to ingrowing nails. Oral septic conditions are held responsible for infections of the gall-bladder, for pathological changes in the heart and kidneys, and for disturbances in the functioning of the ductless glands.

To the swallowing of pathological organisms are attributed several cases of gastro-enteritis, and the daily migration through the intestinal tract of staphylococci, streptococci, pneumococci, *et al.*, from the oral cavity, causes the quiet little appendix to sit up, add -itis to its name, and send a C. Q. D. call for the surgeon.

The most insistent appeal running through the literature of oral sepsis, for the year, is for a broader and better pathological knowledge and sense, and its application to the case in hand. The call is for ability on the part of the general practitioner to correctly diagnose cases of suppuration, maxillary cysts, alveolar abscesses, perforated and infected antra, necrosis, osteomyelitis, epithelioma, and faucial lesions, and syphilitic and other secondary manifestations in their initial appearance in the mouth, referring cases beyond his jurisdiction to proper sources of relief, and seeing well to it that the oral work he undertakes and performs is thoroughly done.

OPERATIVE DENTISTRY.

The general trend of development in operative dentistry, as in other departments of the profession during the past year, seems to have been toward a bigger, broader, and more comprehensive view of the great possibilities of the work.

There are signs of an awakening on the part of the profession to a realization of the great importance of the restoration of occlusion. The study of the nutritional processes, and the relation that proper mastication and insalivation bear to their normal activity, has forced home the fact that prosthetic pieces and restorative operations on teeth *in situ* are practical failures unless proper occlusion is established.

It is not sufficient that the teeth should come together firmly. They must come together in a manner that will permit the normal mandibular movement that is necessary for the proper trituration of the food. In mutilated cases where elongation of certain teeth seems to have locked the bite and limited the freedom of mandibular movement, such teeth must receive radical treatment looking toward a proper adjustment, or else the bite must be opened and all occluding surfaces be built up.

The serious consideration of the problem of restoring occlusion is in no sense a new idea, but the fact that more is being said and written upon the subject today than ever before seems worthy of mention. And the fact that more men in the rank and file of dentistry today realize the importance of this feature of their work certainly gives promise of a higher standard in restorative operations on the natural teeth, as well as a higher standard of masticating efficiency in all prosthetic work.

Probably the most important factor in the recent development and improvement in the standard of restorative operations has been the perfection of a scientific system of casting gold with

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accuracy and precision, as brought before the profession in 1907 by Wm. H. Taggart. Considering the perfected process of gold-casting in the abstract, it is safe to say that no one thing in modern dentistry has done so much to stimulate dentists in their work, or to elevate the accepted standard of operative procedure, as has the gold-casting process. With the facilities now available to every dentist, the day of the ill-fitting, malshaped, nondescript plug of gold must soon pass. It must give way to the perfect-fitting, well-contoured gold inlay, in which the cusps and planes, the grooves and sulci, are present, and the natural anatomical lines of the tooth surfaces are reproduced.

If the masticating efficiency of a broken-down molar or bicuspid is to be restored to normal, the metallic or porcelain restoration must reproduce in detail the characteristic outlines of the occlusal surface of the tooth. While a good general contour and a firm contact point can be obtained with either an amalgam or a good gold foil filling, or even a porcelain filling, it is impossible, with any of the three mentioned, to obtain a perfect reproduction of the occlusal surface. This can, however, be obtained by using a cast gold filling or restoration, because it is entirely possible to carve the wax model to a nicety, showing all the anatomical lines. It is concluded, therefore, that a perfect-fitting, well contoured and properly carved cast gold inlay is the most perfect filling for compound cavities in bicuspids and molars that we have at our disposal.

Essays dealing with all sides of the subject of occlusion in its relation to cast gold fillings have been written by Dr. H. W. Gillett and Dr. J. Lowe Young, of New York.

ROOT-FILLINGS.

Numerous special pastes and patented preparations, the acclaimed virtues of which seem to place a premium upon slipshod root-surgery and canal-filling, are offered to the profession. Fortunately, however, our dental literature is replete with articles dealing with the problem of the scientific treatment and filling of canals, and it is believed that only those who knowingly desire to follow the so-called quick and easy methods will resort to mummifying pastes and other similar methods of uncertain virtue.

It is well recognized that a tooth in which the pulp has become devitalized is valuable to the patient only in proportion as the root-canal or root-canals have been carefully and skilfully treated and filled. In fact, the thorough treatment and filling of all roots and devitalized teeth is the real foundation upon which the superstructure of filling or crown or bridge is to rest, and it is gratifying to know that our better dental educational institutions are now giving more and better scientific instruction along these lines.

The recognition on the part of dentists and physicians of the serious results that may accrue to the health, or even the life, of a patient through foci of infection in the mouth has also had a stimulating effect on the better class of dentists throughout the country.

It is possible that a fuller understanding of bacteriology and a wider knowledge of the source of infections in the oral cavity will result in the more common use of restorative and prosthetic methods in which the elements of danger to the patient are reduced to the minimum.

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It is, perhaps, needless to prophesy that unless dentists themselves realize the danger that lurks in a chronic abscess, or under a badly designed bridge, or about an ill-fitting crown, the time is not far distant when they will have their attention called to it by their brothers of the medical fraternity. The latter may, on just grounds, order the removal of dental work that appears to be having an unwholesome effect on the patient; and it were better, therefore, that dentists take advantage of the present-day knowledge on this subject and safeguard themselves and their patients from embarrassment.

W. D. TRACY, *Chairman,*
D. H. SQUIRE,
F. F. HAWKINS,
Committee.

DISCUSSION.

Dr. A. R. STARR, New York. Your essayist states that perfect occlusion cannot be obtained with gold or amalgam fillings or even with porcelain inlays. I cannot agree with him on that point. I will admit it would be difficult to get perfect occlusion with an amalgam filling in complex cavities, especially when a matrix cannot be left in place until crystallization is complete, but I see no reason why perfect occlusion cannot be obtained with a gold filling, and even with a porcelain inlay, if the inlay be tried in the cavity before the final baking. While I realize the advantages of gold inlays in difficult cases, I am not one of those who believe that gold inlays are destined to supersede gold or amalgam fillings in all cases. I have not thrown away my gold pluggers; I keep them within easy reach, and they are not getting rusty.

I may be *passé* or ultra-conservative, but I cannot bring myself to believe that a gold inlay is better in ordinary cavities than a good gold filling. With the inlay, the cement layer is an element of weakness as well as an element of safety. It is weak in that no matter how infinitesimal the amount at the margin, it is liable to wash out in time, and leave an opening for the entrance of food, saliva, and micro-organisms; and it is only an element of safety in that it affords protection to the pulp. I am confident that I can make a gold filling in ordinary cavities in much less time or in about the same time that it would take to make a wax model and to fit and set a gold inlay, using the direct method, which I consider to be the better one.

The essayist very properly emphasizes the importance of the skilful treatment and filling of root-canals, and advises against the use of mummifying pastes or similar materials in place of the more permanent canal fillings. I prefer to use gutta-percha in all canals large enough to permit of its proper introduction, or a combination of cement and gutta-percha in smaller canals. I consider that the pastes are of use only for temporary work, or as

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a last resort in cases where a canal seems impenetrable. Many failures in root-canal work are due to imperfect knowledge of dental anatomy. How often do we open into an upper bicuspid or a lower incisor or canine and find only one canal filled in cases where there are two! How often do we find the facial canals of upper or the mesial canals of lower molars entirely empty or only partially filled in cases which have been under treatment.

Many of us who imagine we are quite uniformly successful in filling root-canals would receive quite a shock if we would make a radiograph of every such operation. The X ray should be used more frequently in that connection. In regard to the treatment of abscess caused by devitalized teeth, I believe we are more prone to over-treat such cases than not to treat them sufficiently. It is my custom to fill the canals in cases of fistulous alveolar abscess just as soon as those canals can be kept clean and free from moisture long enough to permit the introduction of a pellet of gutta-percha in the apex. In cases of non-fistulous abscess I frequently follow the same method, and if necessary convert the case into a fistulous one, by perforation of the alveolus. With this method many cases which have been under treatment for months will heal in a few days. In regard to pyorrhea alveolaris, that subject was so thoroughly discussed at last night's session that I shall have very little to say about it in this discussion. If pyorrhea be due to malocclusion, I would suggest correcting that malocclusion as nearly as possible, or, better still, anticipate the trouble and put the teeth as nearly as possible in proper occlusion before pyorrhea develops. The less we move the teeth after the disease is well advanced, the better. If the teeth are much loosened and displaced I find I get better results in fixation if I try to hold them in the position in which I find them.

No doubt the vaccine treatment of pyorrhea has a future, but as yet most of us are so wofully ignorant in regard to the proper use of this therapeutic method that it is not likely to come into general use. I believe some cases may be benefited by this treatment, if the proper medium can be found, to combat the diminished opsonic properties of the blood serum and improve the phagocytic action of the polymorphonuclear leucocytes, but until we are more familiar with the subject of general bacteriology and with the etiology of pyorrhea, I fear we cannot make much progress in this direction.

I should imagine that one factor which would interfere with the correct application of this treatment would be that of securing a perfectly typical and uncontaminated sample of bacterial invaders from which to make our autogenous vaccine. Since we have so great an assortment of micro-organisms in the mouth, and since we do not know which of these bear an etiologic relation to pyorrhea, I should think it would be difficult to make a selection of any special culture or cultures, in case we did not use all.

In regard to silicate or synthetic cements, I believe that pulp irritation from their use is due not so much to their chemical activity as to the fact that, being less adhesive than the ordinary cements, they require more extensive cavity preparation.

Most of the other subjects appearing in this paper have been discussed or

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will be discussed in connection with other papers, so I will not refer to them.

Dr. B. S. HERT, Rochester. Occlusion, which is the first phase of dentistry considered in this report, is fully as important as the committee claims, and while many practitioners have always realized its value, a constantly increasing proportion of the members of our profession are, fortunately for their *clientèle* and themselves, appreciating the fact. Our education along this line has been influenced more by orthodontia than any other one factor, although a number of other causes have been active in this connection.

The prominent place gold inlays occupy in restoring lost or correcting improper occlusion is not overestimated; however, the method of carving the planes, grooves, sulci, and cusps is in many cases not the best method of restoring the occlusal surface, as we must usually be guided by the surface of the opposing tooth, which in probably the majority of cases does not present an aspect of that character; and in such instances to make a gold inlay as described in the report—namely, having cusps, sulci, and grooves and planes carved on its surface—would defeat one of the principal objects which it was designed to attain.

Oral sepsis, its harmful effects both local and systemic, and the frequency of this condition as the result of dental operations or the lack of operative procedures by the dentist when indicated, was brought to our attention with almost dynamic suddenness and force by a member of the medical profession a number of months ago. This gentleman rendered a service both to the public and dentistry, and let us hope that more such shocks will be given to our calling, until each member of our profession realizes the important place he and his work should occupy in the healing art. It is unquestionably true that many of even our intelligent practitioners of dentistry fail to appreciate the great influence which we all should, and some now do, exert on the general physical and mental welfare of our patients.

Oral hygiene has by some dentists been called a fad; they say that it has passed over the ridge and that its importance is waning. But the committee evidently do not believe such to be the case, and anyone who has faithfully carried out the idea in his practice, who has educated his patients to do their part and to realize its value, not only locally but systemically, cannot fail to become more and more convinced of its great worth. That it is a cure-all or a preventive for all oral ills is not true, but it is a great aid in both these directions.

While the committee did not mention the administration of oxygen and nitrous oxid for the practice of humanitarian dentistry, it is a branch of our occupation which is of so much merit that it is entitled to have attention drawn to it. By its use, with very few exceptions, cavities can be prepared, teeth with live pulps ground down for crowns, and other dental operations performed without pain and without the slightest danger to the patient. It is one of the most important advances made in dentistry in recent years. With any of the various kinds of apparatus made for the purpose its administration is so simple that a beginner in its use can obtain excellent results, and one with experience will seldom

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fail in obtaining the desired freedom from pain. When the effect is carried only to the analgesic stage, which is sufficient in almost all cases to prevent pain, we have opinions of eminent medical men that there is absolutely no danger.

The report of the Committee on Practice has always been of a high standard, and the committee for this year has maintained the standard set by its predecessors and done its work admirably.

Dr. HENRY W. GILLETT, New York. I would like to say a word concerning the point which Dr. Starr raised in regard to occlusion. It seems to me that he has not entirely grasped the full significance of Dr. Tracy's statement when he speaks of the possibility of restoring the occlusion as perfectly with gold, amalgam, or porcelain as it is now possible to do with the cast gold inlay. No previous generation of dentists has ever had at its command the possibility of restoring the cusps and sulci of teeth to the degree that it is now possible with the cast inlay. Or if, for the sake of argument you consider it to have been possible, it has at least not been feasible within the physical capacity of the patient and operator. To me it seems evident that the restoration of cusps, inclined planes, and sulci is the essential part of the restoration of occlusal efficiency in bicuspids and molars, and I cannot conceive that it is feasible with foil fillings, amalgam, or porcelain, even with all our present knowledge, to anywhere near approach the results in anatomical restoration that we readily get in the adaptation of the wax, which can be so easily duplicated in cast gold.

I wish also to make a second point in connection with what Dr. Starr has said. He has drawn a comparison between the direct and the indirect processes. Limiting consideration to the simplest cases, I would be ready to admit the contention which he has advanced that the average operator may probably do better with the direct process, but it seems to me that one of the very important advantages provided for us by the cast metal process is the opportunity to make large restorations effectively. And while for some time I took the ground that the same care, skill, and attention to detail would produce similar results by either process—the indirect or the direct—for a year or two I have been drifting strongly toward the indirect method as the one capable of producing the best results, and more easily for both the patient and operator—and particularly is this true with regard to extensive restorations. Even if the operator has the skill to carve in the mouth restorations of whole occlusal surfaces, it seems highly undesirable that he should do so, because of the possible accidents which may befall his work before it reaches completion, with the consequent embarrassment of going back to the patients, confessing failure, and asking that they submit to further work in the matter of carving. These are the two points I particularly wished to emphasize.

Dr. TRACY (closing the discussion). I am sorry that more have not taken part in the discussion of the matter presented in the report. It is hard for me to believe that so many men agree implicitly with everything presented, and should they not agree with it, I should have been glad to hear from them.

I was interested to hear Dr. Starr express himself in the matter, and would

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not have him infer for a moment that I have cast aside my gold pluggers or that I have lost my appreciation of the good gold filling in selected places, but my conclusion is that the best possible restoration for compound cavities must be based on what we see and what we do ourselves. I know that I cannot, try as I will, with the foil filling get the results I feel I should get in these cases, and I know I can get the results with the casting process that these cases demand. I am speaking not of small cavities on buccal or approximal surfaces, but of large restorations, compound cavities, mesio-distal cavities where a large portion of the tooth structure is involved, and I know in filling these cavities with gold foil, while we have sealed the cavities and beautifully restored the contact points on the approximal surfaces, we have not restored the masticating efficiency of the teeth, because we have not reproduced the occlusal planes, sulci, and pits that nature put there for a purpose. If we can do that by any method, that method is better than we have been using in earlier years. It has been said that one of the marks of wisdom is a willingness to give up an excellent thing for a better thing. We know that the gold filling is an excellent thing, and many of those who have had a modest degree of success with it have had better success with the inlay. So it seems to me the part of wisdom for all operators to take up the method, and see if they cannot do better. I have profited very much in listening to the suggestions in the reports which followed mine, and hope that more men will take up the feature of reproducing the anatomical occlusion of the teeth either by the indirect or the direct method. As experience accumulates in the use of the indirect method, we find that we can get results with it that we cannot get by the direct process. I know of many instances where proper care has been exercised in the preparation of the cavity and the technique of making the inlay by the direct method has been carefully carried out, but these fillings did not fit the cavities as well as when made by the indirect method with the amalgam die.

I do not wish to further discuss the methods of making inlays, but I do want to express the belief that the gold inlay is the best possible means of restoring badly broken-down teeth today. Teeth can be restored by the cast gold method in such a way that it enables the operator to reproduce the anatomical outlines of the teeth and thus provide the greatest efficiency in mastication.

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Report of the Correspondent.

By Dr. E. B. PRENTISS, New York.

Oral Radiography in Its Relation to the General Dental Practitioner.

I HAD about decided upon another subject for this year's report when a hint dropped by Dr. Hillyer led me to change my plans, the result being the theme announced, "Oral Radiography." It has been my purpose to treat the subject from the standpoint of the general dental practitioner rather than of the specialist.

I have obtained the opinions of some of the best experts in this country, knowing full well that their experienced advice will be invaluable to the dental practitioner who is about deciding to undertake this special work. A great many men have felt the need of an X-ray equipment so convenient as to be brought into use frequently and enabling the finished pictures to be obtained in a very short time; yet they have hesitated to instal an outfit until obtaining fuller knowledge concerning the practicability of such work, and better acquaintance with the dangers to be encountered, and the precautions to be taken, the equipment to be selected, etc.

Keeping these points in mind, I addressed the following letter to several men who have had long experience in this line of work, and especially in dental and oral radiography:

My dear Doctor,—As Correspondent of the New York State Dental Society I am addressing this letter to you. You will be rendering a distinct service to our society and be of great assistance in helping to solve a perplexing problem if you will give us your personal opinion and clinical experience in regard to the following questions:

(1) Do you consider it practical, and if so, essential, that the general dental practitioner should have installed in his office an apparatus for Oral Radiography?

(2) What particular apparatus do you consider the best suited to the needs of the dentist?

(3) What training is necessary in order to become proficient in the safe management of such equipment?

(4) In your opinion, is the danger of injury from the use of the X ray to be seriously considered?—and what precautions should be taken for the proper protection of the operator when handling the same?

An early reply will be greatly appreciated in order that I may include it in my report to be given at the annual meeting of the State Society in May.

Thanking you in advance for any information you may be able to give,

Very truly yours.

In reply I have received seven letters from men who have made this work a distinct specialty—as follows:

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Dr. HOWARD R. RAPER, of the Indiana Dental College, Indianapolis, Ind.

My dear Doctor,—I consider it both practical and essential that the general dental practitioner have a radiographic outfit in his office. Otherwise the radiograph will not be used as often as it should be, and as a result the greatest and best dental service will not be rendered.

The general practitioner of dentistry needs an X-ray coil of such size as to make good dental radiographs on films held in the mouth in exposures of from ten to twenty seconds. The more difficult work, requiring the use of a larger X-ray coil, should be sent to specialists. Of the smaller machines, such as I would advise the practitioner to buy, there are two types. (1) The Ruhmkorff, or induction coil, and (2) the Tesla, or high-frequency coil. If the supply current be "direct," buy a small induction coil. If the supply current be "alternating," buy a suitcase high-frequency coil. A word of warning regarding the suitcase high-frequency coils: While one or two makes are really quite efficacious, by far the most of the coils of this type are mere toys. Insist upon a demonstration before purchasing one of them. If the buyer does not consider expense, he may purchase a large induction coil, or the latest type of coil, called interrupterless coil, or transformer. The heaviest kind of work could be done with these machines.

Personally, I had no training at all. I never saw a radiograph made until I made one myself. It is not necessary, therefore, that a man have the work demonstrated to him. He can learn from reading. When I recall the number of books on electricity, photography, and general radiography that I read to gain my knowledge of the subject, the chaff I had to wade through to get, after all, but a few facts, it seems to me that in giving the profession my book "Elementary and Dental Radiography" I have made the problem of self-education a very simple one for the practitioner who wishes to take up the work.

I know of no place where a man may take a postgraduate course in the work. Though I have considered the establishment of such a course some time during the summer months, at the Indiana Dental College, I have concluded that it would be impracticable. I would not care to try to teach men who were too lazy to learn from the text-book on the subject. True, a man studying from a text-book may need a little special personal assistance—but only a little, which he could probably receive in ten or fifteen minutes from any radiographer. The course given in our colleges should consist of from ten to twenty lectures, and clinical experience in one or more cases.

X rays are dangerous or not—just as arsenic is dangerous or not—according to the manner in which they are used. Improperly handled, they will cause cancer and death; properly handled, they will produce no disastrous results whatever. If the operator will observe a few simple rules, he may practice radiography a lifetime and never produce any pathological effect on his patients. No man should, under any circumstances, engage in the art of radiography without using a lead screen or cabinet for personal protection. To all who contemplate engaging in the work, I would say, Buy a lead screen first, then the balance of the radiographic outfit. The writer uses a homemade lead screen, the lead of which is one-eighth inch thick. No sensible man with open eyes and good ears would stand on a railroad track and allow a train to run over him—because it is such a simple matter, you know, to step off the track. Likewise, no sensible man, whose eyes are open to the dangers of the X rays, will expose himself to their deadly action—because it is such a simple matter to stand behind a screen.

LEWIS GREGORY COLE, M.D., New York, N. Y.:

My dear Doctor Prentiss,—Replying to your letter of March 22d, I would state that I believe it would be just about as practicable for the general practicing dentist to make radiographs of the head and teeth, and properly interpret them, as it would be for me to attempt to fill teeth or put in bridges.

HAROLD S. VAUGHAN, D.D.S., M.D., New York, N. Y.:

Dear Doctor,—I consider it practicable for the general dental practitioner to have an X-ray apparatus in his office. As to its being

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essential, that depends on whether the dentist wishes to do the work himself or refer it to others. If such an apparatus were at hand, its benefits would be utilized more frequently.

The induction coils of such makes as the Kelley-Koett, Wappler, or Kny-Scheerer are very practical and give good oral radiographs with three to five seconds' exposure. For the heavy work of the general roentgenologist the interrupterless transformers are best suited, but they are not necessary for oral work. The high-frequency or Tesla coils are cheaper but less powerful; and require exposures of fifteen to thirty seconds or more, and are therefore of less value, though satisfactory oral work can be obtained with them.

The beginner should be instructed by a competent radiographer as to the necessary precautions about exposing the patient to the X rays—bearing in mind that some persons are more susceptible than others. The dangers to the operator are to be seriously considered and precautions taken to screen the tube from him. This can be accomplished —(1) By a lead or lead-glass screen around the tube. (2) By operating the apparatus from behind a lead screen. (3) Best of all, by operating the switch and rheostat from outside the room, the operator looking through a small lead-glass window, the side of the room being lead-lined.

E. W. CALDWELL, M.D., New York, N. Y.:

Dear Doctor,—In answer to your letter of March 22d, I have to say:

(1) I think it practical, but essential only in towns where no roentgenologist is available.

(2) Induction coil apparatus.

(3) It depends largely upon the patience and the ability of the man. Some men learn to do creditable work in a few weeks and others fail after years. Fortunately the dental work is not difficult.

(4) Danger should be considered serious. Lead screen with rubber gloves, shield for tube, etc., should be used.

Dr. C. EDMUND KELLS, Jr., New Orleans, La.:

Dear Doctor,—I take pleasure in replying to your letter of the 22d.

(1) A few months after Professor Roentgen announced his discovery I installed an apparatus, and have never been without one since; during the past year have probably used it more than ever.

As now perfected it is a practical proposition, and I consider it essential to a practice which strives to give its *clientèle* the very best service possible.

(2) For dental work the most powerful systems are not necessary. A 12-inch coil with chemical break will take skiagraphs with films held within the mouth in from three seconds down to a flash, according to the density of the parts; this on ordinary films and not using a screen. With quick films and with screens this time can be greatly cut down—that is, the three seconds can; the flash, of course, could not.

(3) You have got me there—because it must all depend upon the man. However, this should not be learned from a "correspondence school," but from a good safe operator—which can be quickly done. After the "learning," a little patient work is necessary, that's all.

(4) With the proper "plant," capable of rapid work, and using *all* well-known safeguards, the danger from the use of the X rays for *dental work* is a negligible quantity. The precautions are—*a*, Tube incased in a ray-proof cover of some kind. *b*, The use of a filter. *c*, Short exposures and not repeated indefinitely the same day. *d*, Operator always wearing gloves.

I trust I have covered the ground sufficiently. If not, I will be pleased to give you any further information in my power.

And now, in turn, I would like to ask you a question: Do you think it would be interesting to have a practical demonstration of X-ray work at the coming meeting of the National at Kansas City?

By *practical* demonstration, I mean a full equipment taking skiagraphs for the dentists or their patients and developing and finishing the pictures "while you wait."

SINCLAIR TOUSEY, M.D., New York, N. Y.:

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Dear Doctor,—Replying to your inquiry, there is no reason why a dentist should not become an expert radiographer—and several have done so in different parts of the country. So that my counsel against the use of this method by the general dental practitioner is not from any doubt of his ability, but from my knowledge of the time and study and the cumbersomeness of the apparatus required to produce satisfactory results with safety to patient and operator. Several friends of mine who installed the apparatus in a moment of enthusiasm continue to send their patients to a specialist because they have not been able to give it the study required to become proficient. And we all know that it was in radiography about the mouth that X-ray burns were most frequent in the early stages of the science. The dentist should not take it up for occasional use in his practice unless he is able to give sufficient time and study to it to become expert.

(1) I do not consider it practical for the general dental practitioner. But the X ray is essential to dentistry, and in every locality there should be some physician or dentist expert in its use in its application to dental radiography, to whom dental cases may be referred.

(2) Of course a photographic dark-room is required for developing films.

The least cumbersome and most easily handled X-ray apparatus is a high-frequency coil like the largest portable Victor apparatus. This has the advantage of moderate cost, but of course requires longer exposures and does not give as good results where the whole face must be penetrated, for radiographs of the antrum or the entire jaw. For this work I personally use my largest apparatus, a 15-kilowatt direct current converter, forming an outfit measuring 10 x 4 x 8 feet, in addition to quite a ponderous tube-stand and protective shield. The exposures are from an eighth to a quarter of a second. In connection with the smaller outfit it is essential that the X-ray tube be inclosed in a protective shield (say of lead-glass), which limits the X ray to the proper part of the patient and protects the operator entirely.

(3) The operator should spend a considerable number of hours in an X-ray laboratory learning the manipulation of the apparatus, how to regulate the degree of vacuum in the X-ray tube, and how to develop the films. This facility can be acquired in any X-ray laboratory, but the proper posing of the patient is something requiring special study. Another matter which is almost universally neglected is the study of the X-ray dosage. A person may see radiographs made and note the absence of disagreeable consequences without ever knowing the safety limit of exposure. I was called into a case in a western city where a doctor had been using the X ray successfully for seven years, and finally attempted to make a radiograph of a man's hip twelve inches thick. No pictures resulted from either of two attempts, but a terrible burn followed, which had to be cut out like a cancer, and there was a suit for $50,000 damages. The exposures were longer and stronger than any he had ever made previously, and before applying them he should have known how to measure the dosage and what the effect would be.

The necessity for a knowledge of X-ray dosage enters into dental radiography in the way of determining how many exposures, and of what strength, may be made in a case requiring a number of pictures. The fact that the X ray has a cumulative effect is of vital importance. The same dose divided up in the course of a week has just as much effect as if it were one continuous exposure.

(4) The danger of injury to the operator is very great, and the only safety lies in absolute protection from exposure. I made the mistake in the beginning of considering it necessary to hold the film in the patient's mouth, and though I tried to protect my hands with opaque gloves, my fingers are marred by keratoses which fortunately have never developed into epithelioma, but which resist all efforts at cure. A few exposures produce nothing but benefit to the individual patients, but a great many exposures, from their cumulative effect, are extremely dangerous to the operator. Regardless of the inconvenience, the X-ray tube should be inclosed in an opaque shield, because indiscriminate repeated exposures of the operator standing near a naked X-ray tube produce sterility, various blood diseases akin to leukemia, loss of hair, dermatitis, or epithelioma.

The operators whose deaths are recorded

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in the papers every few months are probably men who thought that their X-ray work would not be extensive enough to require special precautions. One special thing is that the fluoroscope should never be used either for examination or for testing the radiance.

Dr. F. T. VAN WOERT, Brooklyn, N. Y.:

Dear Doctor,—(1) I do consider it practical, and while not essential, think it would be a great advantage to any practitioner to instal in his office an apparatus for oral radiography.

(2) There are a great number of apparatus on the market, but I think those manufactured by Waite & Bartlett, or the Wappler Mfg. Co., are as practical as any, and within the means of almost anyone.

(3) There is very little training necessary for one to become proficient enough in dental radiography for all practical purposes.

(4) I am of the opinion that the X rays are very dangerous and should be very seriously considered—particularly by the operator. But there are appliances which make it simple to eliminate this danger and which are supplied by anyone manufacturing coils and the like. One thing, in particular, all operators should refrain from—holding the film in position when it is exposed to the rays. The patients should be instructed to do this, as the damage to them is practically *nil.* It is a pretty well established fact that the X rays are cumulative—that is to say, the effect of a single exposure is retained by the subject and each succeeding one is piled upon it, until enough has been accumulated to produce a very serious pathological condition. Hence, anyone anticipating the installation of an X-ray apparatus should purchase the same from someone familiar with all the requirements to eliminate the dangers.

Also the following, from general dental practitioners who have not had any experience in the personal operation of the X ray:

Dr. C. N. JOHNSON, Chicago, Ill.:

Dear Doctor,—I am just in receipt of your letter asking for my impressions regarding Oral Radiography. I can answer only the first one, and that in a very imperfect way.

I consider it practical, but not essential, that the general dental practitioner should have an apparatus installed in his office. Without question radiography will clear up many of the conditions which could not well be cleared without it, and it is probable that the more expert one becomes in its use the wider the range of service. In justice to my present point of view I think I must say that I do not believe radiography is quite so reliable in solving certain problems as some of its advocates seem to think. And those who are the most enthusiastic in its praise are quite likely to read into a radiograph of the jaws certain evidence which is not always borne out by facts. For instance, I have found it quite unreliable in diagnosing abscess cavities, their extent, etc. It is very valuable for locating embedded teeth, or other impacted hard substances, and we could not well do without it; but in a large city with experts doing this work I find it more convenient to refer the patient to them than to operate an apparatus in my own office.

Dr. RUDOLPH H. HOFHEINZ, Rochester, N. Y.:

Dear Doctor,—In answer to your letter of March 22d, I beg to say, that Oral Radiography has become an essential factor in diagnosing dental lesions both of a pathological and a mechanical nature. It is my opinion that a practitioner with a competent assistant could have an apparatus installed in his office. This would be more a matter of convenience, however, than necessity.

Oral radiography does not differ from general radiography, and can be obtained by any good radiographist. A higher degree of special efficiency and interest may be gained if the radiographist be a practicing dental surgeon. A rational solution of this question would readily be found if the orthodontist made a specialty of radiography in connection with his own work. He resorts to its use more frequently than the general operator, and his dental intelligence would greatly assist the general practitioner.

A radiographist must have a thorough technical knowledge of his apparatus, and

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that in itself reduces the danger of injury to nil. He must have a well-trained eye for photography, without which he is very apt to look at a picture from the wrong angle. Personally I prefer the result of a specialist in radiography, be it oral or otherwise, to that of the general practitioner who only occasionally uses the apparatus.

Dr. FRANK W. LOW, Buffalo, N. Y.:

Dear Doctor,—I prefer to go with my patient to an expert. I can so demonstrate what I want to know about, that the expert can make a more satisfactory exposure than I can; at least until I have become an expert. This I have never even tried to become.

LEUMAN M. WAUGH, D.D.S., Buffalo, N. Y.:

Dear Doctor,—Your letter has not been forgotten. I have had the unfortunate experience of training a new assistant, and the woman whom I selected has been very slow in grasping things, and as a result my correspondence has suffered. I know it is too late now, but to show my good-will, I shall tell you what I had in mind.

My opinion will not be based on experience. I am about to put in an apparatus, and your report will help me in the selection of what I need. You ask especially for an answer to question No. 1.

I do consider it eminently *practical*. I believe it to be *essential* to the most efficient dentistry. However, I do not believe that it need be a part of every general practitioner's equipment. In fact there are many who would not use it often enough to really master it. In some practices in the remote districts a prejudice against it would have to be overcome. What I do believe that there is a crying need for, is *dentists* who are sufficiently versed in the normal structure and pathology of conditions about the mouth and face, who will take up the work and not only do radiography for dentists, but will interpret the picture, make a diagnosis, and if desired outline the treatment. I might say much about disappointment resulting from work done by men who have not especially studied conditions about the jaws and who do radiography for dentists, but the above positively expresses my opinion.

I shall not venture to answer the other questions, except No. 4. In conversation with Dr. Raper, I learn that he feels that nothing short of a well-made, preferably a home-made, lead screen should be used. When this precaution has been taken he feels as safe as may be; but since the work is only ten years old, no one knows what it may do when followed longer. Personally, I am satisfied to take it up and do all that my practice may demand.

The replies received have treated the question in such a thorough manner, have gone into such minute detail, and have been both so favorable and unfavorable, that I cannot do better than to leave the subject for your discussion, and feel that, thereby, those who have been in doubting frame of mind may be able to come to a very definite and safe conclusion as to the course to be followed.

I wish to add that Dr. Geo. M. MacKee of New York, who had done a great deal of special work along this line, has very kindly consented to be present and give his views in person. I have therefore not included his reply in the main body of this report.

Respectfully submitted,

E. B. PRENTISS, *Correspondent*.

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DISCUSSION.

Dr. GEO. M. MACKEE, New York. I desire to thank the president and members of the society for allowing me the privilege of the floor. I also desire to thank Dr. Prentiss for his kindness in inviting me to discuss this question in person, and for his trouble in obtaining a postponement of one day to allow time for me to come from Washington, D. C., where I was attending another meeting.

I find, by reading the various letters that Dr. Prentiss has received, that there is quite a difference of opinion with regard to the use of the X ray in dentistry. For instance, as extremes, we have Dr. Cole, a radiologist, who considers it about as practical for the general dentist to make a dental radiograph as it would be for Dr. Cole to attempt the filling of teeth. On the other hand, some men who are not radiologists consider it both practical and essential that every dental office be equipped for dental radiography. I do not wish to take a position at either end of this chasm, but place myself in the center—namely, I desire to be conservative.

Being a radiologist and a specialist it is difficult not to be a trifle biased and a little in favor of high specialization in all lines. But I will endeavor to be broad-minded, and to discuss the question in such a manner as to help rather than hinder you in an effort to decide what can be done and what should be done.

The questions asked by Dr. Prentiss are fairly specific, although a trifle ambiguous, but in order to save time and to avoid digressing I will first read and then specifically discuss each one to the best of my ability.

"(1) Do you consider it practical, and if so, essential, that the general dental practitioner should have installed in his office an apparatus for oral radiography?"

The main factors here are "essential" and "practical." Let us consider, first, the practicability. Certainly there are no insurmountable obstacles in the practice of oral radiography. The success of the work will depend largely upon the man; if he has the necessary incentive, ambition, energy, and money, there is no reason why he should not undertake the work. In other words, from a scientific standpoint such an undertaking is practical. On the other hand, it is difficult for me to conceive of a general dentist being able to devote the time necessary to become proficient in radiographic technique and interpretation without letting his general practice suffer. Particularly is this so in the case of the busy practitioner who must accept small fees. It must be remembered that it requires several years of effort before one can master the proper technique and give a trustworthy opinion or interpretation. I should say that from a financial standpoint it would be foolish for the average dental practitioner to enter this field, and when everything is considered I should say that it is not practical for him to do so.

There is one way out of this difficulty,

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however, and that is, if the general practitioner is unable to spare the time for the work, he can obtain an assistant, give him sufficient time for acquiring the necessary skill, equip a laboratory, and place the matter upon a practical, scientific, and profitable basis. I would like to say here that the making of suitable radiographs is not nearly as difficult as their interpretation and verification. I have been doing this work for over ten years. I have no difficulty, with the apparatus obtainable at present, in producing a suitable set of radiographs in most of the cases, but I feel, in spite of years of experience, that I still know very little about interpretation.

To sum up this question, I will say that the practicability depends entirely upon the individual. The sum total of the work requires time, skill, care, and money. If these can be given, then the work is practical. In a general way I should certainly say that it is not practical for any but a few favored dentists to do this work.

Now as to the "essential" feature, or the necessity for each general practitioner doing his own radiographic work. In the first place, is it necessary for every patient to be radiographed both before and after dental work? I should think not, but such a question is not within my province to decide. If such is the case, it would really seem advisable for every dentist to do his own radiographic work, and perhaps in time it will come to this. At the present moment, however, it would seem safe to assume that only a certain percentage of cases require radiographic examinations. The actual number of such cases falling within the practice of any one man, based upon my own experience, would not justify one in saying that an equipment was essential to every office. No matter from what angle one starts to argue these subjects, the paths all lead to the financial question. It is doubtful if the patient would be saved any money in case the dentist did the work, for the latter would naturally charge a fee commensurate with the time, expense, etc., of the operation. This fee is hard to obtain, especially in the case of the general dentist. Most of you are underpaid as it is, and yet, small as are your fees, the patients object to them. It is always possible, by properly approaching a radiographer, to obtain a reduction in fee to almost any extent—at least the fee can and will willingly be made in accordance with the size of your own fee, the income of the patient, and the scientific interest you may have in the case. Would you be willing to do more than that? In all cities, large or small, there are radiographers to whom cases can be referred. To my mind, what is most needed just at present is a more friendly, more thorough, and more scientific co-operation between the dentists and scientific men who are making radiography a specialty.

I know some dentists who are doing excellent radiographic work, but they are, for the most part, either limiting themselves to radiography, are oral surgeons, or, if they have a large general practice, they have an assistant who devotes himself almost exclusively to radiography. It is my experience that one dentist will hesitate to refer a radiographic case to another dentist—the reasons for this are obvious.

Without further discussion, allow me to say that I do not consider it essential for the general dentist to assume the

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rôle of a radiologist. The advisability of his doing so is a different matter, and rests entirely with the individual.

"(2) What particular apparatus is considered best suited for the needs of the dentist?"

This matter is of no great importance. Suitcase outfits are useless, as are, also, static machines, for the simple reason that they will not produce enough current. A Ruhmkorff coil with an electrolytic interrupter offers the most for the money. With this apparatus perfect results can be obtained. The newer and more expensive types of apparatus, such as the interrupterless transformer, offer advantages in greater speed and less trouble. Speed, of course, is essential in many instances, as it precludes the blurring of the image due to motion. If the parts to be radiographed are stationary, slow exposures will produce as good results as rapid ones, with much less expense in the way of tubes, etc. With a coil, satisfactory film radiographs of the teeth can be made in from 1 to 5 seconds; plate radiographs can be taken in from 5 to 20 seconds, and the accessory sinuses in from 20 to 45 seconds, providing a direct primary current can be obtained. With an alternating current more time must be allowed. With the transformer, the exposures would be as follows: Film radiographs, 1/4 to 2 seconds; plate radiographs, 1 to 5 seconds; accessory sinuses, 5 to 15 seconds.

Additional essential apparatus are a suitable radiographic table or chair, a tube-stand with protecting shield, one or more X-ray tubes, milammeter, protection booth for the operator, a good dark-room, as well as innumerable small items.

"(3) What training is necessary?"

In the first place, one need not be an electrical engineer, and no special electrical training is necessary. One must, however, understand his apparatus, and should, in fact, understand the fundamental features of all types of X-ray apparatus, so as to appreciate the limitations and possibilities of these various types before a purchase is made, and to obtain the greatest amount of satisfaction and safety in their use. One must become a thorough student of the X ray, for it is an exceedingly dangerous as well as useful agent. The training necessary for a beginning can be obtained by studying text-books and reading articles on the subject that are found in reliable dental, medical, and other scientific journals. Also by attending courses such as the one given by the Second District Dental Society.

"(4) In your opinion, is the danger of injury from the use of the X ray to be seriously considered?—and what precaution should be taken for the proper protection of the operator when handling same?"

The X ray is a very dangerous agent, and should only be employed by those who are expert in its use. One must understand the nature of the rays of varying quality that are emitted from every tube when in action. One should know what quality of ray is employed when the exposure is made and the amount of this quality used during the exposure. In addition, one must be familiar with the quantity of any given quality of ray that it is safe to employ on any of the various parts of the body. Without this knowledge one never knows when to expect an injurious reaction on the part of the patient's skin, nor how to avoid it. There are various types of apparatus designed

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for the estimation of the quality and quantity of ray, but time will not allow me to even enumerate them.

The protection of the operator is a comparatively simple matter. Under no circumstance should he ever allow the ray to fall upon his own person. Whenever the X-ray tube is in action he must be in a lead-lined booth, having a lead-glass window, and containing the switches, etc., so that he can see and manipulate the apparatus without leaving the booth during the exposure. The operator who takes proper precautions will never receive the slightest injury. On the other hand, carelessness or indifference may lead to disastrous results either to the patient or operator, or to both.

Dr. HENRY W. GILLETT, New York. I shall approach this subject in my discussion from the same standpoint as has the Correspondent, namely, that of the general practitioner. I am familiar with the work only as done for me in my office, and I will report my experience from that standpoint.

Most of what I shall say will apply to the first question asked, therefore I am going to refer first to other questions, and get them out of the way.

With regard to the second question—"What particular apparatus is considered best suited to the needs of the dentist?"—the point I desire to mention is that in my own office we have installed an apparatus which takes up no floor space except that occupied by the tube-stand. This we find a great convenience.

I will make no reference to the third question.

With regard to the fourth I will state my position in this way: We must necessarily accept the view that the X ray is a dangerous agent and one to be handled carefully. From that aspect I deem myself particularly fortunate in having as my assistant Dr. L. E. Palmer to carry out the details of the work. I said to him in the beginning, "See that you yourself and the patient are well protected," and I have left to him the detail of accomplishing this result. I have once or twice consulted him as to whether he felt satisfied that he had gone far enough in securing self-protection as well as protection of the patient. He assures me he has done so, and I am convinced that he takes every proper precaution in that direction. I believe that safety for both patient and operator is easily assured, but I feel that it is very important that the necessary steps to insure safety shall invariably be observed.

With regard to the first question, that is, as to its practicability and as to whether it be essential that the general practitioner should have in his office opportunity to make constant use of the X ray, I think we have heard enough from the reports to feel convinced that it is readily practicable—it certainly has proved so in my own case. As to whether it be essential or not, I would phrase my reply somewhat like this: I believe it to be essential to the practice of dentistry with the highest efficiency. I find myself utilizing the X ray probably a dozen, if not twenty times, now, where I used it once before I had it in my own office. As an example, it occurred one day last week that I wanted eleven different teeth radiographed in one day. It is quite a common thing for me to send three, four, or five patients into the X-ray room in one day, and I believe that every operator who provides in his own

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office convenient opportunity for its use will find himself making constantly increased use of that opportunity. The ability to say to patients, "Please step into the X-ray room," in contradistinction to saying that you wish them to go to Dr. So-and-so and have a radiograph made; of being able to have the wet film in eight or ten minutes, and to examine it for yourself as you go on with your work, instead of waiting until the next day; of being able to judge immediately for yourself concerning the particular case you are at the moment operating upon; the convenience of being able to get a correct view of the anatomical relations of the operating field, and if necessary to make at once a new radiograph, or to say to your associate that you would like to have a radiograph at a slightly different angle, as the one in hand does not bring out what you wish to see, instead of waiting another day for it from the hands of the specialist—the convenience of these factors so far overshadows the inconvenience, the expense, and the difficulty of the installation and the detail work involved that I have arrived at the point where I would scarcely know how to do without my X-ray outfit. It has become essential to the proper conduct of my practice. I am saying this not only from the viewpoint of my own personal convenience, but from the standpoint of living up to my responsibility to my patients.

The question of expense has been raised, and I want to refer just here to a very practical point. I find it much less expensive for the patient to have a fee entered of ten dollars for a radiograph than it is to have the operator spend an hour or two hours trying to find out something that ten minutes in the X-ray room would define accurately. I find it of much greater advantage to them to pay a fee for a radiographic examination, where indicated, with its usual prompt disclosure of conditions, than to pay what would frequently prove an equal or larger fee for time spent in searching for obscure causes of pathological manifestations or for inefficient treatment of undefined conditions. Chronic ill conditions in our field usually become simple when accurately diagnosed. Frequently a radiograph will show the futility of any course of treatment, and so save the patient a series of sittings and the operator a humiliating failure with its attendant loss of prestige. The ability to accurately diagnose septic conditions in the mouth, the ability to locate and define obscure abscess conditions, the ability to define advanced pyorrheal conditions, is of the very greatest advantage to our patients, and the opportunity offered for a prompt diagnosis is of the very greatest service to them. I have had two cases within a few days which have been sufficient in themselves to have warranted in my estimation all the expenditure and all the effort that has been made in my office in the installing and in learning the use of the outfit. I believe that I have saved the lives of two patients within a fortnight because I had at hand the apparatus to define the things I wanted to know and define them promptly. In one case the discovery was incidental. When investigating conditions about a third molar, we discovered extensive septic conditions about the first molar, and I am convinced from the subsequent history of the case that these conditions were responsible for pathological manifestations that had been

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puzzling the patient's physician for a period of two years, and which began to improve within twenty-four hours after the operation resultant from the discovery made by the X ray. In the other case the patient had been in my hands for years with conditions which were worse than I suspected, and had reached the stage where he was threatening suicide, and because I was able to put my hand promptly on the information I wanted, I think I have started him on the road to recovery.

The value of the radiograph in root-canal work cannot be overestimated; the value of having it at hand for the prompt answer of the many questions that come to us in dealing with obscure conditions in root-canals is very great. To cite another case as a concrete example: Within two or three weeks I have been able to entirely change conditions in an important tooth because I had definite information to start with as to what had happened to that tooth. I was able to unravel the difficulties that had perplexed two previous operators on the Pacific coast, and in a short time to arrive at a simple solution of what had been a complex case; and it was just because I had the apparatus at hand, so that on inspection of the first film I could say to my associate, Dr. Palmer, "Please give me a film from this angle." With the information resulting from the second film I was able to start right in my work—when to have taken the wrong course with the tooth would probably have meant its sacrifice.

I scarcely need dwell at all to this audience on the comfort of being able to know before entering root-canals something concerning their length, direction, size, etc., but I do want to say a word concerning something which I believe will come to the front before long—that is, self-protection for the operator as related to the results of his work in root-canals. This thought was planted in my mind by Dr. F. T. Van Woert during our trip to Chicago last winter to the Brophy dinner. Every operator in this room has realized repeatedly in the past that his root-canal results were frequently different from what he had supposed them to be when he had completed his operation. With the radiograph we have a way of determining what the efficiency of our root surgery has been after it is completed. Now let us suppose a condition of affairs which may readily arise—that an operator believes he has found all the canals there are in a tooth, and that he has filled each one of these canals to its apex. Let us imagine that he has failed to find some canal, or that he has failed to fill the apical third or half of a root-canal. Suppose that septic conditions develop and the case gets into hostile hands, and there comes an occasion for the review of these conditions before the courts—a situation quite possible. What is going to be the reply of the operator to the court when asked why he did not take advantage of the known facilities of his profession to determine, when he had finished this work, whether or not it was properly performed? What answer can be made to the question, Why did you not protect your patient from these possibilities? I have given a good deal of thought to the hypothesis presented by Dr. Van Woert somewhat along these lines, and I am beginning to feel that the certainty of safety, the certainty of self-protection, and, beyond that, the certainty of knowledge that we have done our best for the patient,

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can only come to us when we adopt as routine practice the radiographic inspection of our surgical work in root-canals. I am convinced from consultations I have recently had with medical men that the time is close at hand when they are going to demand from us the elimination of abscess foci from our field. I am strongly of the opinion that any practitioner who will provide himself with the means for diagnosing the conditions in advance, and for inspecting his work at its completion, will much more readily accomplish this result and will have much greater satisfaction in the practice of his profession.

Dr. A. R. STARR, New York. I have not had any practical experience with the X ray, and unfortunately know very little of its physical properties, but I do appreciate its advantages from the diagnostic standpoint. We appreciate it to such an extent in the college with which I am connected that we have a series of lectures on the subject every year, and every student is obliged to take a practical course of demonstration of its use before he can graduate, and is also obliged to take a special examination on the subject. That is how much we appreciate its diagnostic value, and that is how much we anticipate the probability that the use of this method may sometime become general. Personally I wish I could have an X-ray picture both before and after every operation upon root-canals, because, as I said in a previous discussion, some of us, I think, would get quite a shock if we could see these radiographs of root-canal fillings. It is undoubtedly of great value not only in root-canal work but in many other ways. Dr. Gillett mentioned the advantage in estimating the length of the root-canal, and that factor alone will be of great aid to us in our work upon root-canals.

As regards the danger to the operator and patient, I cannot speak from personal experience, because I have not used the X-ray apparatus, but I do not believe the danger feature is entirely eliminated at the present time. I have had an example of that in my practice quite recently. A patient who lived out of town had a condition which required the use of the X ray. I advised her to go to a specialist in New York for a radiograph, but because of the fact that she lived so far away and did not have time to stay in the city to have the work done, she went to a local hospital in the town in which she lived and had an X-ray picture taken. The operator told her that it was rather an old apparatus, and that he would have to make considerable exposure to get a proper picture. I believe she was subjected to an exposure of three minutes, and that patient received a burn on the side of the face and lost her hair over an area of nearly two square inches upon that side of the head. It seems to me that there is no excuse at the present time for such results.

As I said before, it would be of great benefit to us if we could take a radiograph of every root-canal operation, and we should keep a record of those radiographs, for it would be an excellent means of instruction. The chief difficulty in following that plan would be the financial one. There is no question about the scientific advantage of it, but probably there would be difficulty in some cases in getting sufficient remuneration for the amount of time expended. I think as a rule patients are more willing to pay a good fee to the specialist than they are to the general prac-

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titioner, and I firmly believe that one of the reasons why pyorrhea specialists are so successful in combating that disease is because they charge such a fee that they scare the patient into taking proper care of their own mouths.

Dr. LESLIE E. PALMER, New York. The practical side of the paper has been so well covered by the preceding discussion that I merely want to make a few rambling remarks, possibly touching a few high points on the other side, and go into a little of the practical detail of doing X-ray work.

In the beginning I wish to say that I think it is certainly an advantage to any practice, and an essential to every well-equipped office. The letter written by Dr. Raper possibly expresses my thought on this subject better than any of the others, but my one criticism on his letter is that it would tend to lead one to think that the use of the X ray is a perfectly simple matter. It is not entirely simple, any more than any other problem you handle in your dental work. It requires practice, and with practice it does become simpler. As Dr. Gillett said, the great advantage of doing the work in your own office is the greater frequency with which you make use of the X ray. If one sends the work out to a specialist, even if he is in your own town, it generally takes twenty-four hours before he can expose the film, develop it, and have it thoroughly dried and returned to you; whereas, in a large majority of cases, if this work is done in your own office it means simply that the patient has to leave the chair for a few minutes to have the picture taken, and this can be finished up while the patient is still in the chair, and you can go ahead with an added knowledge of what you are dealing with.

Until some few years ago, in order to get the proper preliminary knowledge necessary for using the apparatus, it was necessary to delve through large treatises on the subject, pick out what seemed the most interesting, and then, after securing the necessary amount of theory, go ahead and find someone who had had some practice, get some of his knowledge, and combine the two. The articles by Dr. Raper that appeared in the *Items of Interest* about a year and a half ago have eliminated all of the superfluous material and compressed the thing into a nutshell, as it were, and I very strongly recommend these articles to anyone interested in the work. Even though one has had a great deal of experience, there is much to be gained from them. After having covered these articles rather thoroughly, combined with the demonstration that the manufacturer gives who sets up the apparatus, you are, I think, in position to work out your own salvation.

As to the different types of apparatus, as Dr. MacKee said, the coil is probably the most satisfactory. The big interrupterless machine is too powerful and too costly to be a necessity in the dental office, while the high-frequency machine does not carry sufficient power.

The rays are without question dangerous, and this should always be borne in mind and guarded against. They are a possible element of great danger, and should be always recognized as such. The two first results that one may experience from over-exposure are burns and sterility. The burns are not those we ordinarily know which raise blisters, but more in the form of a dermatitis, not

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especially sore, but look more like sunburn. I have had none myself, but have seen them developed on others rather seriously.

The question of sterility is one that we must always consider. There is no doubt but what one constantly exposed to the rays will be rendered sterile. That brings up the question as to a few of the things we need to do to guard against such possibilities. In the beginning the men who used the X ray regarded it very much as we regard the electric light, and used it with the same amount of freedom. At one time nothing was thought of standing in front of the fluoroscope and having the bones of the body shown up, and the men who did that from day to day are the ones who suffered from serious results such as we read of in the papers from time to time. To get down to the definite dental work, one should always insist on the patients' holding the film themselves. It does not take long, and the patients can hold it in place where directed. They only have to stand the rays for a few seconds and it does not affect them, but you who would be exposed to the rays very often, cannot stand it three or four times a day, week after week. Never stand in front of the tube, because most of the strong rays come from that side of the tube. Do not use a fluoroscope unless you are perfectly protected. For the protection of the patient the tube should be covered and should have only a small opening to allow the rays to come out. As further protection a sheet of aluminum interposed between the patient and the tube will absorb many of the soft rays and give an equally good picture. The X-ray apparatus as set up in running order seems to be a pretty complicated affair, but after one becomes accustomed to the use of it and dissects the various parts, it is not so complicated as it would seem at first sight.

I cannot help feeling, notwithstanding some of the beautiful dental radiography that is done by some of the medical specialists, that the dentist is much better equipped to produce and interpret dental results than anyone else.

Dr. PRENTISS (closing the discussion). Owing to the lateness of the hour and because of the fact that, while I myself have had no experience in this work, it has been so ably discussed by those who have had experience, I will not say anything further in closing. I wish, however, to thank all who have taken part, and those who have answered the letters of the Correspondent; and especially to thank Dr. MacKee, who made the trip here especially for this occasion, for the able and efficient discussion he has given us.

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Report of the Committee on Scientific Research.

By Dr. W. B. DUNNING, Chairman.

FOR four years we have been fortunate in having the services of Prof. W. J. Gies of Columbia University to carry on the work of the committee in harmony with a plan decided upon from time to time. It has been the object of the committee during that period to take up whatever subject we might choose, in as thoroughgoing a manner as possible, and from the beginning it has seemed that the general subject of the causation of dental caries and its possible prevention were the paramount problems to be considered.

The committee has acted in an administrative way only with Dr. Gies—that is, in an official capacity: Professor Gies has not only done the work, but has dominated the conduct of our whole policy. In his last year's work he felt it important to investigate thoroughly the subject of sulfocyanates, as they appear in the fluids of the body and not merely in the oral cavity. His report last year, as it appeared, speaks for itself, but he felt that certain phases relative to the origin, physiological significance, and pharmacology of sulfocyanates had not been investigated sufficiently to close this subject. He has, with the assistance of two able men, Dr. Lieb and Dr. Kahn, prosecuted his work during the current season, and will now present his report. It gives me much pleasure to introduce to you Prof. William J. Gies.

[For Prof. Gies' address see next page.]

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A Further Study of Sulfocyanate in Its Possible Relation to Dental Caries.*

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THE work about to be described has been conducted under the auspices of your Research Committee, and has been intended to solve some of the problems connected with the possible relation of sulfocyanate‡ to dental caries. The research has been both a continuation and an extension of the investigation we discussed in our last annual report.

I. Summary of the General Conclusions in Last Annual Report.

A year ago we communicated findings and deductions that may be briefly and very generally summarized in the following direct assertions (*Cosmos,* January 1913, pp. 42–53):

(1) Bunting's§ conclusion, that his ether modification of the ferric chlorid test for

* To the substance of the address, as given in this official stenographic report of it, the authors have added various details which were suggested in a general way by the speaker and promised for his published account of his research. The experimental work was done in the Biochemical and Pharmacological Laboratories of Columbia University, at the College of Physicians and Surgeons, New York, under the auspices of the Research Committee of the Dental Society of the State of New York, Dr. William B. Dunning, chairman.

† The previous papers in this series, by Dr. Gies and collaborators, were published in the *Dental Cosmos,* as follows: 1910, lii, p. 1141; 1911, liii, p. 1324; 1913, lv, p. 40.

‡ Although the term *thiocyanate* is gradually replacing "sulfocyanate," we continue to use the older term for the sake of conformity in usage with previous reports on this subject by your research committees. "Sulfocyan*ide*" is obsolete.

§ Bunting: *Dental Cosmos,* 1910, lii, p. 1346.

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sulfocyanate was more delicate than the classical procedure, was ill-founded. Bunting's opinion, that observed analytic differences in favor of the latter process were due to something important in saliva that was not sulfocyanate, *e.g.* diacetic acid, and which occurs in saliva quite regularly, was also untenable. (Page 42.)

(2) The classical ferric chlorid method, as well as Bunting's modification of it, is unsuitable for the *quantitative* determination of sulfocyanate in *tissues* (page 42). The Rupp, Schied, and Thiel* iodometric method, though detailed in procedure, is very accurate for such work. (Page 43.)

(3) Sulfocyanate occurs normally, in small proportions, in the blood and lymph, and in various other parts of the mammalian organism. Sulfocyanate is not a characteristic constituent of saliva or of salivary glands—it may be absent from both (page 45). The salivary glands are probably not producers of sulfocyanate, merely the outlets for its ejection from the blood, in some animals; for other animals, the salivary glands are not even excretory channels for sulfocyanate. (Page 50.)

(4) Our analytic data on the *distribution* of sulfocyanate "indicate strongly that, in dogs, sulfocyanate is produced in and excreted from the liver; that sulfocyanate circulates in the blood to all the usual channels of excretion; that sulfocyanate is eliminated from the blood in bile and urine. Our failure to detect sulfocyanate in the combined salivary glands from six dogs accords with previous observations to the effect that dog *saliva* does not contain sulfocyanate. The excellent condition of the average dog's teeth is an interesting fact for consideration by those who believe that caries in people is due to the absence (or reduction in the proportion) of salivary sulfocyanate. It is highly probable that the quantity of sulfocyanate (produced?) in the liver, and the proportion of that substance in the blood, in people, is much greater than that in dogs; and that, on this account, the salivary glands in people have opportunity and occasion to participate in the process of *excreting* sulfocyanate *from the blood.*"† (Page 45.)

(5) Proceeding in the belief that sulfocyanate results in the body from a union of cyanogen (—CN) and sulfid (—SH) radicals, we obtained results which indicated that added amounts of simple substances containing or yielding —SH radicals did not markedly affect the excretion of sulfocyanate. Direct addition of —CN-yielding material to the small available supply of such substance in the body induced notable increases in the elimination of sulfocyanate (page 47 and Table III). "Since considerable —SH-sulfur results from ordinary metabolic transformations of proteins, it is probable that sulfur in such radicals is freely available at all times for any sulfocyanate synthesis that may tend to occur. On the other hand, the exceptionally violent toxicity of the —CN radical suggests that this radical never occurs normally in animals in proportions comparable with those of the —SH radical. Our experimental data accord with the opinion that the amount of sulfocyanate depends primarily on the available supply of the constituent radical which happens to occur in the body in the smaller proportion, namely the —CN radical." (Page 47.)

(6) "Our experimental data on the origin of sulfocyanate suggest strongly that sulfocyanate results from the metabolism of protein, that the liver is the organ chiefly concerned in the production of sulfocyanate, and that the salivary glands *excrete* rather than secrete sulfocyanate in saliva." "If these views are correct, they suggest, further, why *no one has shown* that sulfocyanate, a *waste product*, bears any functional relation whatever to the teeth or oral membranes." (Page 49.)

(7) "No *rational* explanation has been offered for the supposed effects of sulfocyanate, in salivary proportions, on the formation of bacterial plaques or on bacterial growth or activity. Our first studies under your auspices* have convinced me that sulfocyanate does not, and, in the proportions of its occurrence in saliva, *cannot* appreciably retard the growth of oral bacteria, or impair their nutrition, or reduce their capacity to produce acid from carbohydrate." (Page 50.)

(8) Toxicological experiments yielded results which suggested that "dosage with sulfocyanate may be a dangerous procedure. They certainly indicate that the pharmacology of

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* Rupp and Schied: *Berichte der Deutschen chemischen Gesellschaft*, 1902, xxxv, p. 2191. Thiel: *ibid.* p. 2766. Edinger and Clemens: *Zeitschrift für klinische Medizin*, 1906, lix, p. 223.

† Such a difference would be analogous to a number of dissimilarities between human and canine metabolism, which are illustrated by the well-known discordance in the metabolism of nucleoproteins (and purins in general).

* Seaman and Gies: *Dental Cosmos*, lii, 1910, p. 1141.

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sulfocyanate should be thoroughly understood by those who determine how much and how often sulfocyanate shall be administered" (page 53). "Our profound ignorance of the pharmacology of sulfocyanate should prevent us from proceeding empirically in its therapeutic use without due regard for considerations more immediately important, possibly, than those of preventing or curing or alleviating dental caries by such dubious means." (Page 51.)

(9) "Our results strongly suggest an extension of this work along the several lines I have indicated. They emphasize especially the need for thorough determinations of the hidden effects of doses of sulfocyanate that produce no gross toxic symptoms—doses given to mammals, and particularly to men who would volunteer to submit to such treatment after its possible dangers were clearly and fairly indicated." (Page 53.)

II. A Further Inquiry into the Chemical Origin of Sulfocyanate.

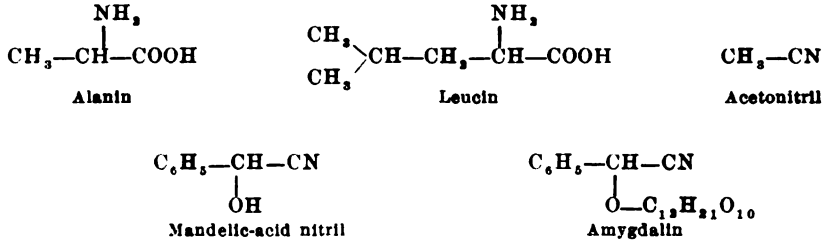
The concluding paragraph in the foregoing series of quotations from our last report indicates the spirit and scope of the work we have lately been doing under the auspices of your Research Committee.

A year ago our conclusions regarding the *chemical* origin of sulfocyanate were based on theoretical considerations to some extent, but, in the main, upon positive influences of —CN-containing (or -yielding) substances on the production (and excretion) of sulfocyanate in dogs. We had successfully completed nine experiments with sulfur (2), sodium sulfid (2), taurin (2), thiourea (2), and cystin (1), all *sulfur-containers,* with results that were mainly negative in this connection; but, in the time that remained before your meeting last May, we were able to conduct only four experiments with —CN-containers (or -yielders): Acetonitril (1), alanin (1), and glycocol (2).

The generally positive indications with the latter substances, coupled with the fact that our experiments with them were comparatively few, led us, in harmony with the suggestion quoted above, to extend the work in this direction at our first opportunity.

Accordingly, proceeding by the methods that were detailed in our last report, we have studied the effects, in five additional experiments on sulfocyanate production and excretion, in dogs, of the administration of the following amino-acids and nitrils: alanin (1), leucin (1), acetonitril (1), mandelic-acid nitril (1), and amygdalin (1). The results have emphasized the findings and conclusions reported a year ago.

The chemical formulas for these five substances are appended:



In Table I we summarize the analytic data of these five new experiments, with the results published a year ago; and, in addition, present information on the quantities of sulfocyanate per 100 grams of mass involved in every case in each of the twenty experiments.

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A detailed inspection of the analytic data, *especially the calculated values per hundred grams of material,* reveals a slight though distinct tendency on the part of the sulfur-carriers, as a group, to augment the production of sulfocyanate*; and shows a decided increase in the formation of sulfocyanate, as a result of the administration of aceto-nitril and mandelic-acid nitril. Amygdalin, though a —CN-container, was without effect. We have indicated, in Table I, with bold-faced numerals, the data which appear to us to be the most significant.

The two ordinary nitrils and amygdalin (a nitril-glucosid), referred to in Table I, *contain* —CN radicals and exchange them in metabolic reactions. The three amino-acids, alanin, glycocol, and leucin (Table I), do not *contain* —CN radicals; but Plimmer† found that, by suitable oxidation, two of these amino-acids *yielded hydrocyanic acid* (HCN) in the following proportions: Glycocol, 11.1 per cent.; leucin, 0.68 per cent.; alanin, 0.

Our results on sulfocyanate production, from leucin, accord with Plimmer's purely chemical finding in this connection, *i.e.* a small quantity of a substance which at best yields little —CN, *leucin,* failed to influence the formation of sulfocyanate. Our results with glycocol are in general harmony with Plimmer's observation, but our positive findings with alanin do not accord with the negative expectation from Plimmer's data in this connection, unless we assume that the increased production of sulfocyanate (following the introduction of the *comparatively large amounts of alanin*) was due to a special formation of —SCN radicals *from other amino-acids that were available in the body* at the time, and which, "spared" in part from their usual fate by the ready substitution for them of some of the excess of administered alanin, were free to contribute in small degree to the production of sulfocyanate. This is a very reasonable view of the matter. Just as carbohydrate may "spare" protein from metabolic consumption when carbohydrate is eaten in abundance, so an excess of one amino-acid might be able to protect portions of an available supply of another amino-acid, in the nutritional exchanges.

The small amount of amygdalin that could be given satisfactorily during the six days of experimentation, contained so slight a proportion of —CN radicals (5.1 per cent.) that the negative finding with respect to sulfocyanate production in this connection is explained on that basis alone.

Our new observations emphasize the conclusions we stated a year ago on the chemical origin of sulfocyanate, and place our deductions on this matter upon a broader and more substantial basis.

Our general conclusion that sulfocyanate arises in the body from a union, directly or indirectly, of —SH and —CN radicals is not original with us nor has it been resurrected by us; it is a current theory which has received much verbal attention though little experimental study. The following facts from biological and chemical literature support the view our experimental data have indicated in this connection (A–H):

* Pollak found, in experiments he failed to describe, that the administration of sulfur, sodium thiosulfate, sodium xanthogenate, and cystein did not increase the urinary excretion of sulfocyanate. *Beiträge zur chemischen Physiologie und Pathologie,* 1902, ii, p. 430.

† Plimmer: *Journal of Physiology,* 1904, xxxi, p. 65.

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TABLE I. DATA PERTAINING TO THE PRODUCTION AND DISTRIBUTION OF SULFOCYANATE* IN NORMAL DOGS AND IN DOGS UNDER VARIOUS CONDITIONS OF TREATMENT.†

Dog. No.	Wt.	Period. A—Preliminary. B—Dosage.	Dosage. Days before dosage.	Dosage. Days of dosage.	Substance given.	Urine. Average per day. Vol.	Urine. KSCN* Total.	Urine. KSCN* Per 100	Feces. Average per day. Wt. dry.	Feces. KSCN* Total.	Feces. KSCN* Per 100	Blood. Wt.	Blood. KSCN* Total.	Blood. KSCN* Per 100	Liver. Wt.	Liver. KSCN* Total.	Liver. KSCN* Per 100	Bile. Wt.	Bile. KSCN* Total.	Bile. KSCN* Per 100	Stomach Contents. Wt.	Stomach Contents. KSCN* Total.	Stomach Contents. KSCN* Per 100	Intestines and contents. Small. Wt.	Small. KSCN* Total.	Small. KSCN* Per 100	Large. Wt.	Large. KSCN* Total.	Large. KSCN* Per 100
	kilos.				grams.	c.c.	mg.	mg.	gm.	mg.	mg.	gm.	mg.	mg.	gm.	mg.	mg.	gm.	mg.	mg.	gm.	mg.	mg.	gm.	mg.	mg.	gm.	mg.	mg.
I. Distribution of Sulfocyanate in Normal Animals: "Control" Experiments.																													
(1)	12.1		0	0		405	3.9	0.97	34	8.7	26.1	765	17.8	2.4	280	10.7	4.0	9	3	33.	128	0	0	589	9.6	1.75	175	5.5	1.2
(2)	11.8		0	0		361	3.8	1.08	30	8.2	24.7	635	20.4	3.3	230	12.2	5.3	4	0	0	172	0	0	595	9.4	1.56	147	8.7	3.4
II. Distribution of Sulfocyanate after the Administration of Sulfur and of Substances Containing Sulfur, chiefly —SH-yielders.																													
(3)	11.4	A	5			482	3.7	0.81	42	8.6	21.5																		
		B		7	Sulfur (35)	384	4.0	1.07	67	10.4	15.5	653	27.6	4.2	258	25.8	**10.3**	17	3.2	19.2	110	0	0	253	10.3	4.12	127	8.7	6.8
(4)	8.7	A	5			290	3.0	1.03	40	9.1	22.5																		
		B		7	Sulfur (35)	300	3.7	1.23	51	9.6	19.2	580	22.5	3.9	297	21.6	7.2	22	4.0	20.0	128	0	0	295	11.2	3.4	55	5.4	**10.8**
(5)	6.9	A	5			268	2.8	1.12	26	4.9	19.6																		
		B		5	Sodium sulfid (0.75)	278	4.0	1.44	32	7.9	23.7	508	38.8	**7.8**	236	27.0	**12.0**	29	3.7	12.0	131	3.5	2.7	328	20.6	5.2	152	16.2	**10.8**
(6)	8.2	A	11			290	2.5	0.80	34	5.8	17.4																		
		B		5	Sodium sulfid (0.75)	316	4.5	**1.50**	35	7.4	23.2	467	42.4	**9.4**	267	22.7	**9.0**	25	0	0	126	4.8	3.2	289	17.5	**5.9**	172	10.2	5.6
(7)	8.4	A	8			276	4.0	1.03	35	7.3	21.9																		
		B		4	Taurin (2.5)	295	5.8	**1.93**	43	8.9	22.1	475	28.5	**6.7**	275	15.1	7.5	18	0	0	207	0	0	305	15.4	5.1	162	9.7	6.4
(8)	8.6	A	8			310	4.3	1.40	32	6.1	18.3																		
		B		4	Taurin (2.5)	301	5.0	1.66	45	9.6	24.1	505	24.6	**4.9**	244	12.7	4.9	28	0	0	195	0	0	327	17.2	4.2	155	7.5	5.0

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(9)	7.9	B	. .	6	Thiourea (32.5)	261	2.5	1.01	31	5.9	17.7	470	20.7	7.6	263	17.5	7.1	30	4.6	**23.0**	170	0	0	295	20.3	6.8	100	7.1	4.1
(10)	8.0	B	. .	6	Thiourea (32.5)	268	2.7	1.04	39	6.3	15.5	465	19.4	**4.8**	185	22.8	**12.8**	20	8.7	18.5	222	0	0	306	17.6	5.5	146	8.3	5.6
(11)	7.8	A	3	. . . . .		183	2.1	1.20	30	3.2	9.8	. . . . .			. . . . .			. . . . .			. . . . .			. . . . .			. . . . .		
		B	. .	7	Cystin ‡ (6.5)	186	2.5	1.40	28	3.4	10.4	. . . . .			242	24.7	**9.8**	32	4.4	13.2	. . . .		0	. . . . .			84	9.2	**11.2**

III. Distribution of Sulfocyanate after the Administration of Amino Acids and Nitrils, chiefly —CN-yielders.

(12)	9.2	B	. .	5	Glycocol (5)	308	3.5	1.15	36	7.9	23.7	510	29.3	**5.8**	. . . . .			. . . . .			170	0	0	385	27.5	4.9	163	17.2	**10.9**
(13)	6.5	A	2	. . . . .		155	1.8	1.12	20	2.5	12.5	. . . . .			. . . . .			. . . . .			. . . . .			. . . . .			. . . . .		
		B	. .	5	Glycocol (16.5)	148	6.1	**3.03**	21	6.2	**31.0**	380	20.4	**5.4**	192	17.3	**8.7**	20	5.3	**26.5**	142	0	0	207	11.2	5.6	141	12.7	**9.7**
(14)	7.9	A	6	. . . . .		238	2.7	1.08	36	4.4	13.2	. . . . .			. . . . .			. . . . .			. . . . .			. . . . .			. . . . .		
		B	. .	5	Alanin (24)	293	6.1	**2.01**	40	5.5	13.5	410	21.8	**5.4**	243	18.7	7.4	21	6.2	**31.0**	105	0	0	348	25.4	**7.2**	61	10.3	**17.1**
(15)	6.36	A	3	. . . . .		138	2.3	1.61	23	0.7	2.9	. . . . .			. . . . .			. . . . .			. . . . .			. . . . .			. . . . .		
		B	. .	6	Alanin (16.0)	146	3.2	**2.33**	29	1.4	4.3	472	28.5	**6.0**	205	21.9	**10.9**	27	4.4	16.3	72	0	0	169	17.4	10.3§	. . . . .		
(16)	6.2	A	3	. . . . .		123	2.6	2.04	9	1.1	12.1	. . . . .			. . . . .			. . . . .			. . . . .			. . . . .			. . . . .		
		B	. .	4	Leucin (2.55)	137	2.8	1.89	21	1.5	7.5	412	14.2	3.5	174	Lost	. .	32	3.9	11.7	98	0	0	228	11.7	5.2§	. . . . .		
(17)	10.8	A	2	. . . . .		230	3.1	1.30	40	9.3	23.0	. . . . .			. . . . .			. . . . .			. . . . .			. . . . .			. . . . .		
		B	. .	5	Acetonitril (2.5)	284	5.9	**2.12**	35	8.6	25.8	560	47.0	**8.4**	287	18.4	6.7	16	6.5	**45.5**	142	0	0	340	21.5	**6.14**	144	10.6	**7.6**
(18)	4.7	A	3	. . . . .		139	2.4	1.71	12	0.9	7.1	. . . . .			. . . . .			. . . . .			. . . . .			. . . . .			. . . . .		
		B	. .	6	Acetonitril (4.6)	146	3.8	**2.52**	21	1.0	9.4	344	31.7	**9.0**	195	27.5	**13.5**	20	7.9	**39.5**	105	0	0	248	29.3	11.7§	. . . . .		
(19)	7.2	A	4	. . . . .		196	2.7	1.35	30	1.3	4.3	. . . . .			. . . . .			. . . . .			. . . . .			. . . . .			. . . . .		
		B	. .	5	Mandelic-acid nitril (2.45)	182	3.7	**2.06**	39	1.9	4.7	375	34.4	**5.2**	184	21.05	**12.0**	34	9.2	**27.6**	70	0	0	237	17.4	7.5§	. . . . .		
(20)	5.42	A	4	. . . . .		161	2.4	1.53	18	1.0	5.2	. . . . .			. . . . .			. . . . .			. . . . .			. . . . .			. . . . .		
		B	. .	6	Amygdalin (3.8)	160	2.7	1.70	23	1.2	4.7	372	18.5	**4.9**	174	8.4	4.8	17	2.7	16.2	75	0	0	244	19.5	7.8§	. . . . .		

* Contents of sulfocyanate are expressed as milligrams of potassium sulfocyanate. † Experiments 1 and 2 were "controls." Experiments 3–11 were planned to determine effects of sulfur and sulfur-containing substances. Experiments 12–20 tested effects of three CN-containers and three typical amino acids (products of protein metabolism, —CN-yielders). ‡ Crude cystin. § Data for combined contents of small and large intestines.

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(A) Proteins are converted into amino-acids by the normal processes of *digestion* and *assimilation*. Amino-acids are absorbed from the intestines into the blood, distributed to the tissues, and used by the cells.

Proteins yield prussic acid (HCN) by various *laboratory methods* of decomposition that involve chemical processes similar to those which are operative in the animal body. Amino-acids also yield —CN-products of analogous kinds under similar laboratory conditions.

The sequence of changes involved in the possible production of —CN radicals from proteins and amino-acids *in metabolism*, by elimination of carbon dioxid and subsequent oxidation, is suggested by the formulas [*a*] above.*

(B) When —CN-compounds of mineral types, such as potassium cyanid (KCN), are introduced into the body, sulfocyanate (—SCN) is speedily produced from them. When certain —CN-compounds of organic nature, such as acetonitril (CH_3—CH) are administered, the production (excretion) of sulfocyanate is increased. (See footnotes †, ‡, also under §, next page.)

The conversion, in the body, of certain —CN-compounds into —SCN-products, presumably by combinations with —SH radicals, accords in principle with the well-known reactions outlined by the chemical equations (1) and (2) below.

(C) Nitrils (organic cyanids) in the form of glucosids (such as amygdalin and phaseolunatin) are produced abundantly in plants and may easily be isolated from them—see formulas [*c*] below.

[*a*] $$R{-}CH(NH_2){-}COOH \xrightarrow{-CO_2} R{-}CH_2{-}NH_2 \xrightarrow{+O_2} R{-}CN + 2H_2O$$

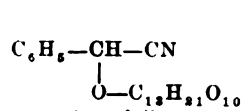
(1) $$S + NaCN = NaSCN$$

Sulfocyanate produced from sulfur and sodium cyanid by fusion

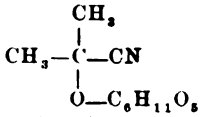
(2) $$(NH_4)_2S_2 + NaCN = NaSCN + 2NH_3 + H_2S$$

Sulfocyanate produced in an aqueous solution of yellow ammonium sulfid and sodium cyanid by boiling

[*c*]



Amygdalin



Phaseolunatin

Plants convert —CN radicals into innocuous and useful forms such as these glucosids.

Nitrils have never been detected in normal *animal* tissues, although they seem to occur transiently in animal cells. The highly toxic character of —CN-compounds suggests that the *proportion* in which they appear at any place in the body is always exceedingly small under normal conditions. Animal organisms do not *retain*, in any form, —CN radicals that result from metabolic changes, or which may be admin-

* Besides our own finding that glycocol (CH_2—NH_2—COOH), when administered to dogs, increased the production of sulfocyanate, are the similar observations of Willanen (*Biochemische Zeitschrift*, 1906, i, p. 129), to the effect that administration (to rabbits) of glycocol itself, as well as of the glycocol-yielders, adenin and creatinin, caused increased urinary excretion (production) of sulfocyanate.

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istered. These radicals appear to be hydrolyzed into corresponding organic acids (salts); but are also eliminated unchanged, or modified into forms that are less toxic and promptly excreted, *e.g.* sulfocyanate. (See the concluding equations in section E below.)

(D) When a given quantity of sulfocyanate is introduced into the body, practically all of it is excreted in the urine.* This fact gives further emphasis to the opinion that sulfocyanate is purely an *excretory* product.

(E) The production of —SCN-compounds from —CN-substances in the animal body appears to be a physiological method of *detoxification*—a *defensive measure* similar to the detoxification, in the liver, of indol resulting from intestinal putrefaction, into indican, a normal urinary constituent. The quantities of sulfocyanate that normally occur in animal tissues and fluids appear wholly devoid of toxic influence.

That the production of sulfocyanate is a defensive process may be inferred from the findings published by Lang,† and Heymanns and Masoin.‡ These investigators found that when sodium thiosulfate was promptly injected under the skin or into the circulation of rabbits or dogs to which potassium cyanid had been given, a *protective* action of the thiosulfate made it possible for the animals to *withstand the effect of three or four times the fatal dose of cyanid.* Sulfocyanate was produced in this detoxification by a process that apparently involved oxidation:

$$KCN + Na_2S_2O_3 + O = KSCN + Na_2SO_4$$

Malonitril $(CH_2)_2{=}(CN)_2$ was not only detoxified in this way, but toxic symptoms which had been induced by its administration were effectively alleviated by the prompt introduction of thiosulfate, which acted as an antidote, sulfocyanate being formed in the process.§ The injected thiosulfate, in these massive doses, seemed to react with the cyanid as other sulfur-carriers, normally present in the organism, act upon the traces of nitrils that result from protein metabolism.

The general steps in the conversions of organic cyanids (nitrils), into (1) organic acids (salts) or into (2) sulfocyanate, as the changes may occur in normal metabolism, are suggested by the equations (1) and (2) here given.

The first of these two reactions occurs,

(1) $$R{-}CN \xrightarrow{+H_2O} R{-}CONH_2 \xrightarrow{+H_2O} R{-}COONH_4$$

[Nitril hydrated into amide, then into acid (salt).]

(2) $$HS{-}R + R{-}CN = HSCN + R{-}R$$

[Sulfid (from protein) and cyanid (nitril) yield sulfocyanate.]

* Pollak: *Beiträge zur chemischen Physiologie und Pathologie*, 1902, ii, p. 430.

† Lang: *Archiv für experimentelle Pathologie und Pharmacologie*, 1894, xxxiv, p. 247; 1895, xxxvi, p. 75.

‡ Heymanns and Masoin: *Comptes rendus de la Société de biologie*, 1896, x, p. 26.

§ See also Hunt: *Arch. internat. de pharmacodynamie et de thérapie*, 1904, xii, p. 447; *Journal of Biological Chemistry*, 1905, i. p. 33; *Bulletin No. 69, Hygienic Laboratory, U. S. Public Health and Marine-Hospital Service*, 1910, pp. 1–89.

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at best, to a slight degree. The second appears to represent the main process of protection against the influence of —CN-compounds.

results from a union of carbon disulfid and ammonium radicals, since sulfocyanate may be artificially produced by such a synthesis:

$$CS_2 + 4NH_3 = NH_4SCN + (NH_4)_2S$$

[Production of ammonium sulfocyanate by heating carbon disulfid with alcoholic solution of ammonia.]

(F) The HS— in the hypothetical "HS—R"-substance, suggested below, appears to be derived from protein. When protein or any of its —SH-containing metabolic derivatives (*e.g.* cystin) is heated with sodium cyanid, sulfocyanate is formed. Hydrogen sulfid is ejected from protein by caustic alkali and is evolved abundantly during the putrefaction of protein.

Protein yields numerous —SH products *in metabolism* and *in intestinal putrefaction,* among them thio-amino acids, that are *abundantly available* for use in physiological detoxification of —CN-compounds, with resultant production of sulfocyanate.

(G) Not only does the introduction of certain —CN-containing materials increase the output of sulfocyanate by the defensive changes indicated above; but, sulfur-containing substances, when introduced into the body, may unite with —CN radicals there available and markedly increase thereby the output of sulfocyanate, as is shown to some extent by the results of our own experiments, but especially by those of Bruylants,* who noted increased excretion of sulfocyanate in human urine after the inhalation of carbon disulfid. It is possible, however, that in the case of carbon disulfid, the production of sulfocyanate

(H) All the essential radicals for the normal production of sulfocyanate *appear to be derived from protein or protein decomposition products.* Sulfocyanate has been obtained *directly* from protein by destructive distillation, by fusion with alkali, and by treatment with boiling caustic alkali.* It may be produced more abundantly by the decomposition of a mixture of protein and cyanid.†

III. Effects of Fasting, and Overfeeding with Protein, upon the Production and Elimination of Sulfocyanate.

In our last report we referred to the effect of fasting on the production and elimination of sulfocyanate, and said: "If sulfocyanate is produced from —CN radicals that are released in protein metabolism, the tissues and excretions would probably contain smaller proportions of sulfocyanate during a fast, because protein metabolism is thereby reduced to a minimum. We tested this matter by subjecting a normal dog

* See Bruylants: *Jahresbericht der Thierchemie,* 1888, xviii, p. 134 (abstract by Herter).

* Bruylants, *loc. cit.,* p. 136.

† Interesting discussions of some of the facts suggested above have been published in the last edition of Part 2 of the Neubauer-Huppert "Analyse des Harns für Mediziner, Chemiker, und Pharmazeuten," 1913, p. 746. See also Kahn: "Biochemical Studies of Sulfocyanates," Dissertation (Ph.D., Columbia University, 1912, chap. I). Neuberg: "Der Harn," 1911, p. 651. Röhmann: "Biochemie für Mediziner, Zoölogen, und Botaniker," 1908, p. 355.

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weighing 8.46 kilos to a seven-day fast. At the end of that period the animal was completely exsanguinated by the method already described. There was marked diminution in the amounts of sulfocyanate in the urine, feces, and tissues,* in some cases to 50 per cent. of the 'normal' values." (Page 50.)

The experiment referred to in this quotation has been repeated, with similar results. Our analytic data for the first of these experiments were not published in our last report. We include them here with the data for a second fasting experiment and for a recent "overfeeding" experiment.

GENERAL PROCEDURE.

During the progress of each experiment the animal was confined in a metabolism cage of the kind described elsewhere.† The daily food was uniform in character and quantity for some time before the experiment was started as well as during the "fore" period of each experiment, and consisted of adequate amounts (per kilo of body weight) of the mixture of hashed lean meat (15 gm.), cracker-meal (4 gm.), lard (3 gm.), bone-ash (1 gm.), and water (35 cc.), which we have been using for years in nutrition experiments on dogs, to the greatest advantage in the work and to the highest satisfaction of the animals.‡ Throughout the "fore" periods, for two of the dogs, the total amounts of daily urine and feces were carefully determined and recorded; and the amounts of sulfocyanate in these excreta per day were ascertained. In this way the *normal* elimination of sulfocyanate, under the initial conditions of the experiment, was established. Fasting, or feeding with increased amounts of meat ("overfeeding"), was then begun and continued for a number of days, in accord with the general requirements of such work. Sulfocyanate, as before, was determined in the carefully collected urine and feces, for the purpose of ascertaining whether the nutritional change had affected its quantitative output.* Finally, sufficient time having presumably elapsed for the registration of measurable effects on the production of sulfocyanate, the animal was bled to death from a femoral artery under local cocain anesthesia; and, after complete exsanguination, some of the blood and certain other carefully isolated parts of the body were analyzed for sulfocyanate, to determine whether the treatment had increased or decreased the local production or retention of sulfocyanate.

Metabolic Data.

1. *First fasting experiment.* Initial weight of dog, 8.46 kilos. "Fore" period on standard diet, 4 days. Fasting period, with water *ad lib.*, 7 days.†

2. *Second fasting experiment.* Initial weight of dog, 6.7 kilos. "Fore" period

* In this statement, the phrase "and tissues" was included by mistake.

† Gies: *American Journal of Physiology*, 1905, xiv, p. 403.

‡ Gies: *American Journal of Physiology*, 1901, v, p. 235; Steel and Gies, *ibid.*, 1907, xx, p. 343.

* The Rupp, Schied, and Thiel iodometric method was employed for the determination of sulfocyanate. See Rupp and Schied: *Berichte der deutschen chemischen Gesellschaft*, 1902, xxxv, p. 2191. Thiel: *ibid.*, p. 2766. Edinger and Clemens: *Zeitschrift für klinische Medizin*, 1906, lix, p. 223. Kahn and Gies: *Dental Cosmos*, 1913, lv, p. 43.

† The first experiment was conducted a year ago with special reference to the proportions of sulfocyanate *in the tissues*. The data for urine and feces were not noted in a *daily* record, such as appears here for the other two experiments of this series.

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on standard diet, 4 days. Fasting period, with water *ad lib.*, 6 days. The daily record is appended (Table II).

3. *Overfeeding experiment.* Initial weight of dog, 4.85 kilos. "Fore" period on standard diet, 3 days. Period of overfeeding, 7 days. The daily record is appended (Table III).

"per 100," in Table IV with those in Table I.) Although the *total* metabolism decreases toward the vanishing point during fasting, *protein* metabolism proceeds actively so long as life continues. Possibly sulfocyanate normally results wholly from *endogenous protein changes* that are not materially affected

TABLE II. DATA PERTAINING TO THE SECOND FASTING EXPERIMENT.

Day. No.	Condition.	Urine. Vol.	Urine. KSCN.* Total.	Urine. KSCN.* Per day.	Feces. Weight dry.	Feces. KSCN.* Total.	Feces. KSCN.* Per day.
		cc.	mg.	mg.	gm.	mg.	mg.
1	Fed	230	5.75	2.88	42	2.70	1.35
2	"	255			40		
3	"	225	6.10	3.05	38	3.24	1.62
4	"	240			43		
5	Fasted	80			10	. . . . .	
6	"	50	3.90	1.30	0		
7	"	45			0		
8	"	70			0	(Intestinal contents), 6.35	1.27
9	"	45	3.55	1.18	0		
10	"	48			0		

* *Total* sulfocyanate is expressed as *potassium* sulfocyanate.

The analytic data for the tissues from the dogs in these three experiments are summarized in Table IV.

The sulfocyanate data for the fasting and overfeeding experiments do not give positive support to our theory that sulfocyanate results from protein metabolism. The production of sulfocyanate, as indicated by its *excretion,* was perceptibly decreased during fasting, but was increased very slightly if at all during overfeeding with protein. If, however, the production of sulfocyanate is estimated from the data for its *distribution,* the figures indicate that it was not materially affected by either fasting or overfeeding. (Compare the figures by the *amount* of ingested protein.†

† Sulfocyanate may be similar to creatinin in this respect. Although creatinin is evidently derived from protein or protein decomposition products, the amount of creatinin in the urine is independent of the quantity of *protein* in the diet, and is excreted by the kidneys very constantly, hour by hour and day by day, in a given normal individual. Even during fasting, for periods of the length selected for the above-mentioned experiments, the decrease in creatinin excretion is comparatively slight. This general agreement in behavior, and the fact that the ingestion of creatinin is followed by an increased output of sulfocyanate, may be a significant correspondence. The senior author intends to give this matter experimental attention in the near future, especially the questions pertaining to the endogenous production of sulfocyanate.

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The quantity of —CN-production in normal metabolism is very slight at best, and probably only a *few* nitrogen-containing radicals in *certain* proteins are involved.

If the metabolism of protein, *as protein*, were the essential factor in the yield of sulfocyanate, our results in this connection would dispute our theory; but, since the normal yield of sulfocyanate appears to depend mainly on the production or evolution of —CN radicals from *parts* of proteins (intracellular?), and since the availability of such

TABLE III. DATA PERTAINING TO THE OVERFEEDING EXPERIMENT.

Day. No.	Weight of meat in food (per kilo. of body weight).	Urine. Vol.	Urine. KSCN.* Total.	Urine. KSCN.* Per day.	Feces. Weight dry.	Feces. KSCN.* Total.	Feces. KSCN.* Per day.
	gm.	cc.	mg.	mg.	gm.	mg.	mg.
1	15	170			18		
2	15	155	6.77	2.35	18	3.17	1.06
3	15	160			22		
4	30	170	4.90	2.45	33	4.20	2.10
5	35	140			50		
6	40	134	4.85	2.43	57	Lost	. . . . .
7	45	190			55		
8	50	230			60		
9	60	225	7.95	2.65	75	5.50	1.83
10	65	245			64		

* *Total* sulfocyanate is expressed as *potassium* sulfocyanate.

TABLE IV. DATA PERTAINING TO TISSUES FROM THE DOGS OF THE 3 NUTRITION EXPERIMENTS.

Parts.	Experiment. Fasting (1). Weight.	KSCN.* Total.	KSCN.* Per 100 grams.	Fasting (2). Weight.	KSCN.* Total.	KSCN.* Per 100 grams.	Overfeeding. Weight.	KSCN.* Total.	KSCN.* Per 100 grams.
	gm.	mg.	mg.	gm.	mg.	mg.	gm.	mg.	mg.
Bile	19	4.7	24.8	12	2.05	17.1	39	6.75	17.3
Blood	455	15.3	8.4	292	17.2	5.9	340	19.9	5.9
Brain	55	0	0	. . .	. . .	. . .	. . .	. . .	. . .
Heart	60	0	0	. . .	. . .	. . .	. . .	. . .	. . .
Intestine (large)	50	0	0	85	6.35	4.3	72	15.4	5.8
Intestine (small)	180	0	0	112			195		
Kidneys	45	0	0	49	0	0	43	0	0
Liver	180	12.4	6.9	156	14.7	9.4	227	16.7	7.4
Pancreas and spleen	32	0	0	37	0	0	45	0	0
Stomach contents	85	0	0	42	0	0	117	Lost	. . .

* *Total* sulfocyanate is expressed as *potassium* sulfocyanate.

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—CN radicals must depend on the *nature* of the proteins concerned, as well as on the character and extent of their metabolic *disintegration*, the above negative findings are seen in their true significance.*

The amino-acids derived from the proteins in a given mass of food are also probably so well *balanced* to meet the assimilation needs of the organism, that sulfocyanate may fail to arise from any of them to any marked degree because there are no surplus radicals of the proper kind for such an outcome. On the other hand, the administration of a fairly large quantity of a *single* amino-acid, *e.g.* glycocol, that is capable of yielding —CN radicals (Table I) may, because of its redundancy and consequent nutritional uselessness, easily pass, in part, into the sulfocyanate channel of production and excretion. This particular phase of the subject requires further investigation.

IV. On the "Anatomical" Origin of Sulfocyanate.

A year ago we said:

Our experimental data on the origin of sulfocyanate suggest strongly that sulfocyanate results from the metabolism of protein, *that the liver is the organ chiefly concerned in the production of sulfocyanate*, and that the salivary glands *excrete rather than secrete* sulfocyanate in saliva (page 49). . . . The chemical defenses of the organism are presumably just as effectively operative in this connection as in any other. The liver combines the —HSO_3 radical with putrefactive indol from the intestine (after oxidizing the indol to indoxyl), thus converting the toxic indol into a much less toxic substance (indican) prior to its elimination in the urine and in other excretions. In like manner (our data suggest) the toxic —CN-products of metabolism, or of extraneous introductions, are suitably modified and combined, in part at least, with freely available, normally occurrent —SH radicals, *apparently in the liver*, into much less toxic sulfocyanate prior to elimination of the latter in the urine and in other excretions. (Page 49.)

These conclusions, involving the liver as the organ *chiefly* concerned in the production of sulfocyanate, were based on the comparatively large proportions of sulfocyanate in the liver and bile of exsanguinated dogs; on the prominent activity of the liver in protein and sulfur metabolism, as shown especially by the utilization in the liver of cystin and sulfate in the production of taurocholic acid, indican, etc.; and on the important part the liver plays in detoxifications in general.

We have recently sought to overthrow this general conclusion, if ill-founded, by raising and attempting to answer the following specific and very pertinent question in this connection: Would the proportion of sulfocyanate in blood from a given animal be increased, if some of that blood were passed repeatedly through the surviving liver of the same animal? We tested this matter in five experiments in the following direct way.

Dogs that were well nourished on our standard laboratory diet were bled to death, in each case from a femoral artery, under local anesthesia. The animal, reclining on its back during the bleeding and subsequent procedure, was kept covered with rubber cloth; and a warm-water bag under the dog aided further in retarding the rate of fall of body temperature. In each experiment the blood was directed from the cannula through a rubber tube into a bottle completely covered with a rubber membrane,

* If sulfocyanate were characteristic of saliva, endogenous production of sulfocyanate might be ascribed to the salivary glands. In dogs both saliva and salivary glands are free from sulfocyanate.

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into which a protruding glass stirring-rod was fastened. The blood was promptly defibrinated with the rod, the rubber covering (which fitted tightly over the bottle and against the rod) preventing evaporation. The temperature of the defibrinated blood was kept at 37° C. until the animal could be prepared for the perfusions—a few minutes after the defibrination of the blood.

Immediately after the death of the animal, the liver was exposed, cannulas quickly inserted into the portal vein and inferior vena cava, and all other blood-vessels connecting with the liver, outside of this circuit, were closed at once with a general ligature, and the warm blood was promptly perfused rapidly through the liver *in situ*. Perfusion was accomplished by gravity from an elevated buret. The blood, kept continuously as near 37° C. as possible, was passed through the liver repeatedly (4–14 times). During the periods of collection, the blood was kept in closed bottles, so that evaporation was reduced to a minimum. Samples of the defibrinated blood as it was first obtained, and after various excursions through the liver, were analyzed for sulfocyanate by the Rupp, Schied, and Thiel method already referred to. The essential data are summarized in Table V.

TABLE V. DATA PERTAINING TO THE LIVER-BLOOD PERFUSION EXPERIMENTS.

(Sulfocyanate content in the blood is expressed as milligrams of KSCN per 100 cc.)

Perfusion trip.	Experiments.				
	1	2	3	4	5
		*			†
0 (Control)	3.70	. . . . .	3.25	5.20	4.15
1	. . . . .	4.14	. . . . .	. . . . .	. . . . .
3	4.15	6.72	5.30	8.75	8.90
6	**4.73**	. . . . .	5.70	**9.62**	**9.27**
7	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
8	. . . . .	**6.91**	. . . . .	. . . . .	. . . . .
9	. . . . .	. . . . .	. . . . .	9.50	. . . . .
10	. . . . .	. . . . .	**5.94**	. . . . .	9.13
14	. . . . .	. . . . .	. . . . .	. . . . .	9.25
Liver (—SCN expressed as KSCN *per 100 gm.*)‡	5.57	11.70	8.18	9.78	9.79
Weight of liver (gm.)	372	405	657	483	485

* Sampling of the original supply of defibrinated blood was overlooked.

† Before perfusion, the blood received an addition of 1 cc. of 1 per cent. (vol.) solution of acetonitril per 100 cc. (0.01 per cent. of acetonitril in the blood used).

‡ Blood was expressed from the liver as thoroughly as possible by hand before the tissue was subjected to analysis.

The following exceptions may be noted in the routine described above: In experiment 1 the liver was surrounded with warm physiological salt solution

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After the blood became *very* dark, a result of repeated perfusion, its aëration was quickly accomplished, in experiments 3–5 by pouring it back and forth quickly from one bottle to another. The ensuing loss by evaporation must have been comparatively slight. The blood tended to re-clot, after several excursions, in experiments 1 and 5. When this occurred, thorough defibrination of the whole volume was effected promptly and perfusion was resumed at once. In experiments 1–3 the liver was very turgid at the end of the experiment; especially so in experiment 3. Our operations were not as rapid in the first three experiments as we made them in experiments 4 and 5; the temperature of the liver was not only lower than normal at the beginning of the perfusions, but there was more time for clotting in the hepatic capillaries. In experiment 5 the blood was perfused, at comparatively great speed, with the aid of a large syringe.

It is very obvious, as one inspects the data in Table V, that the blood acquired an increased content of sulfocyanate with each successive perfusion, so long, apparently, as the hepatic cells retained their transforming activity. *That the increases in proportion of sulfocyanate were not due to concentration of the blood* by evaporation or by withdrawal of water in other ways, chemical or mechanical, is shown by the fact that although all such tendencies would assuredly have been cumulative to the end of each of these experiments, the values for content of sulfocyanate did not increase appreciably during the second half of any of the experiments. It is also apparent that the liver itself, in each case, tended to acquire a supernormal content of sulfocyanate, probably because of impairments of the power of excretion from the individual hepatic cells. (Compare the results in Table V with the "normal" figures "per 100" in Table I.)

The increase in sulfocyanate content in the blood was particularly marked as a result of the presence of acetonitril (experiment 5), presumably because of the conversion of the latter, in part at least, into sulfocyanate.

These results fortify our conclusion that the liver is an active factor in the production of sulfocyanate and that such production occurs, under hepatic influences, at the expense of —CN radicals.

We hope to conduct additional experiments by this particular method, especially with blood containing other —CN carriers, also —SH-yielders, and mixtures of some of each, although we can hardly expect to derive, from such an extension of the work, anything beyond an addition of details to the principle already established by the results in Table V.

In this connection we recall the fact that Pascheles* sought to determine the seat of the conversion, in the body, of cyanid into sulfocyanate. To this end, he "digested" both surviving and dead muscle, and liver, with small proportions of sodium cyanid. He found that although sulfocyanate was produced in each mixture (10–30 per cent. conversion), *the liver was more active in this respect than muscle.* The change was found to occur at a temperature as low as 0° C., though very much more slowly than at the temperature of the body.

In work with *pure* sodium sulfocyanate (Kahlbaum preparation), Pol-

* Pascheles: *Archiv für exper. Pathologie und Pharmakologie*, 1894, xxxiv, p. 281.

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lack* found, as we noted before, that sulfocyanate was excreted almost wholly in the urine within four to nine days after the introduction of relatively very large doses in five dogs, one rabbit, and one man. This work, by improved methods, explains and corrects the contrary findings of Bruylants, Lang, and others. Pollak inquired whether *surviving liver* had the power to *destroy* sulfocyanate, but his experiments answered the question in the negative—a fact in general harmony with our own finding that sulfocyanate is *made in the liver.*

Some years ago, in a study of the thyroid, with special reference to its detoxifying power, Hunt† selected acetonitril as the "indicator." He found that the ingestion of thyroid by mice diminished their susceptibility (increased their resistance) to acetonitril. Hunt said, in discussing this result (page 43): "It is *possible* that the administration of thyroid so alters the metabolism that more sulfur (by which cyanogen compounds *are normally neutralized in the body*) is made available. . . . A number of writers have pointed out an important relationship between the thyroid and proteins. Thyroidectomized animals, for example, succumb very quickly when put upon a meat diet." Possibly this is due, in part, to a loss in power to detoxify (convert) —CN into —SCN radicals.

Later Hunt published the following conclusions in this connection.‡

> Guinea-pigs upon a limited diet excrete a smaller percentage of the cyanogen of acetonitril *as sulfocyanate* than do those upon an unrestricted diet. . . . Certain diets, notably glucose, oatmeal, *liver* and *kidney*, greatly *increase the resistance of mice to acetonitril;* their effect is similar in this respect to the administration of thyroid. . . . . Certain diets (notably eggs, milk, cheese, and various fats) greatly *lower the resistance* of certain animals to acetonitril; their effect is the opposite of that of thyroid. Several glands (notably prostate, ovaries, and testes) have an effect upon the resistance of animals to poisons similar to but *much less marked than that of thyroid.* Other glands (thymus, parathyroid, suprarenals) have either no effect or an effect opposite to that of thyroid (page 89). From these experiments and considerations it seems very probable that it is possible to influence in a specific manner, by diet, one of the most important hormones in the body (page 73).

In a more recent publication on the effect of diet upon the resistance of mice to acetonitril, Hunt* wrote as follows:

> The high degree of resistance of mice to acetonitril caused by certain diets is due in part to the activity of the thyroid gland (page 1032). Although it is possible that the effects differ in different classes of animals, it would be interesting to determine if, in cases of hypothyroidism, the administration of oatmeal and *liver*, for example, would have a favorable influence, and if the withholding of them from patients with hyperthyroidism would be found advantageous. . . . While my experiments show that the effect of oatmeal and *liver* is in part due to an effect on the thyroid, they show equally plainly that other factors are involved (page 1033).†

These findings are very significant for the student of the biological origin of sulfocyanate. They suggest that variations in diet affect the production of sulfocyanate, directly as well as indirectly: directly, by varying the gross *supply* of —CN- and —SH-yielding substances (exogenous); indirectly, by so influencing the thyroid and probably other

* Pollak: *Beiträge zur chem. Physiologie und Pathologie*, 1902, ii, p. 430.

† Hunt: *Journal of Biological Chemistry*, 1905, i, p. 33.

‡ Hunt: *Bulletin No. 69, Hygienic Laboratory, U. S. Public Health and Marine-Hospital Service*, 1910, p. 88.

* Hunt: *Journ. Amer. Med. Association*, 1911, lvii, p. 1032.

† See also Trendelenberg: *Biochemische Zeitschrift*, 1910, xxix, p. 396. Lussky: *Amer. Journal of Physiology*, 1912, xxx, p. 63.

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organs whose hormones may control metabolism in the cells of the liver, and other parts, as to increase or decrease *endogenous tendencies* to (detoxifying, protective) sulfocyanate synthesis.

The following comment by Gamgee is very suggestive in this connection.*

Fenwick,† who has paid much attention to the variation in the amount of sulfocyanic acid in the saliva, believes that the salt is a product, and so indirectly affords evidence of the nitrogenous metabolism of the organism, and that its amount diminishes, under conditions in which the activity of the nutritive functions is diminished. He considers, though on evidence which is indirect and unsatisfactory, that the sulfocyanic acid of the saliva is genetically related to the organic sulfur compound of the bile—an opinion which he bases especially on the statement that whenever the bile is prevented from reaching the alimentary canal, the sulfocyanate of the saliva disappears. It appears desirable that the statement of Fenwick should be controlled by observations on animals in which biliary fistulæ have been successfully established.

The senior author intends not only to test the concluding suggestion in the foregoing quotation, but also to determine the effects on the excretion of sulfocyanate of feeding *liver* and administering *bile,* bile salts, and bile extracts.

V. Is Sulfocyanate Produced in the Salivary Glands?

The presence of sulfocyanate in the saliva of man does not necessarily imply that human salivary glands *produce* sulfocyanate.

Schneider‡ has reported the exceptional case of a young man whose saliva, though frequently tested, was found to be free from sulfocyanate. "After an interval of a year the sulfocyanate reaction was still absent in this individual, and its presence in his saliva could only be demonstrated by concentrating large quantities of the fluid."

Sulfocyanate is a constituent of the secretions, in man, which bathe the conjunctiva and the nasal mucosa.* Just how much sulfocyanate that is often attributed to human "saliva," originates in the nasal mucosa and is concentrated on the mucosa before admixture of some of its secretion with the oral fluids, has not been determined. *Clinical* records on the content of sulfocyanate in saliva, which do not present definite information on this point, are of little value.

The uniform absence of sulfocyanate from dog saliva shows that sulfocyanate is not ordinarily produced in detectable proportions, if at all, in canine salivary glands. It is highly probable that the salivary glands in other species of animals fail to *produce* sulfocyanate.

Although sulfocyanate is not produced in the salivary glands of dogs, it is *excreted* by these glands after its administration to dogs. Pollak,† in accord with other observers, was unable to detect sulfocyanate in dog saliva and in salivary and pancreatic glands of dogs (in the case of the glands both before and after autolytic disintegration). He observed, however, that after the subcutaneous injection of sulfocyanate, some of the substance appeared in the saliva—2.5 mg. of sulfocyanate (expressed as NaSCN) were found in 68 cc. of saliva collected within eight hours

* Gamgee: "Text-book of the Physiological Chemistry of the Animal Body," 1893, ii, p. 20.

† Fenwick: "The Saliva as a Test for Functional Disorders of the Liver." London, 1889.

‡ Schneider: *Amer. Journal of Physiology,* 1901, v, p. 276.

* Muck: *Münchener med. Wochenschrift,* 1900, xlvii, p. 1168.

† Pollak: *Biochemische Zeitschrift,* 1912, ii, p. 432.

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after such an introduction of 415 mg. of sodium sulfocyanate. Pollak quotes Edinger and Treupel to the same general effect.

We also found that sulfocyanate, after *intravenous* injection of comparatively large doses into anesthetized dogs, appeared promptly in saliva collected through a cannula, the saliva obtained before the injection having been free from sulfocyanate.

It is well known that administration of a small amount of sulfocyanate to a man is promptly followed by increases in the amounts of sulfocyanate in his saliva and urine.

If sulfocyanate is *secreted* by the human salivary glands, if any real utility in the mouth can be ascribed to salivary sulfocyanate, it might be expected that there would be definite relationships between glandular activity and sulfocyanate production; but, instead of definite relationships, all available records emphasize the utter lack of any such uniformity. If sulfocyanate is not merely *excreted* from the salivary glands in accord with the influence of a prevailing surplus of that substance in the blood, but instead is produced independently in the salivary glands by a true *secretory* process, it might be fairly assumed that the proportion of sulfocyanate in saliva would increase rather than decrease as a result of secretory *stimulation*. Yet the opposite is the case. Thus, Schneider found that "The excretion of sulfocyanate may be considerably diminished by prolonged stimulation of the salivary glands. For example, in one case when the flow of saliva was continuously provoked by chewing a piece of soft paraffin for three hours it diminished . . . from 0.004 per cent. at 8.15 A.M. to 0.002 per cent. at 11 A.M. (expressed as KSCN). . . . This observation was frequently confirmed in other cases. No constant relationship between the content of sulfocyanate and the composition of the saliva (organic matter, ash) could be ascertained in a series of estimations made with this point in view."*

These and many similar observations indicate, plainly enough, that although sulfocyanate is not *secreted,* it can be abundantly *excreted,* by the salivary glands in dogs (and similar animals?). The data also suggest that sulfocyanate is not *produced* in the salivary glands, in man, that it is merely *excreted* by the salivary glands, human blood containing sufficient sulfocyanate, presumably, to induce such excretion fairly continuously in addition to that which occurs in the urine and through other channels. But these observations and opinions, together with the fact that sulfocyanate cannot bear any relation to the truth conveyed by the phrase, "clean as a hound's tooth," *fail to suggest a protective influence of salivary sulfocyanate on the teeth.* If we *must* persist in trying to find such a relationship, isn't it about time for us to swing to the other extreme, and begin to assume the *worst*—that sulfocyanate may be *detrimental* to the teeth? This appears to us to be quite as logical and probable, *from the facts at hand,* as the inference that sulfocyanate is *beneficial*—which

* Schneider: *Amer. Journal of Physiology,* 1901, v, p. 278. Such results as these might suggest, of course, that the glands became exhausted and on that account weakened, temporarily, in their power to secrete sulfocyanate. The results might also imply that the secretion of water was especially increased as the stimulation continued. But neither of these assumptions strengthens the prophylactic argument in behalf of salivary sulfocyanate.

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is not saying anything convincing, we admit!

VI. On the Pharmacology of Sodium Sulfocyanate.

In our report a year ago, we said:

Earnest students of the problem of dental caries, who entered this field long before we did and whose desire to explain and prevent the disease is quite as sincere as ours, believe the results of their work indicate that the internal administration of sulfocyanate is preventive, alleviative, and curative of dental caries. They attribute the therapeutic value of sulfocyanate to the smaller portion of the administered substance which reappears in the saliva, and seemingly ignore the influence and fate of the larger portion of the dose which does not pass into the saliva. *In spite of the fact that the pharmacology of sulfocyanate has not been effectively studied,* some dentists recommend the internal administration of comparatively large doses of sulfocyanate and have been administering such doses *without any apparent regard for effects, good or bad, that may be registered on any other part of the body than the teeth.* If it were impossible to ascertain the pharmacologic effects of sulfocyanate, this empirical treatment might be excusable, but the present concentration of attention on the effects of sulfocyanate on the teeth and the disregard for systemic influences it may exercise, is contrary to the spirit of modern medicine and a reflection on the practice of dentistry.

I say this without reference to the ultimate outcome of investigation of this matter. I cannot declare that the internal administration of sulfocyanate in certain doses is without therapeutic advantage—that such doses do not possess curative or palliative effects in dental caries—for I do not know. I cannot say that such doses, if valuable in dental caries, are appreciably harmful in other respects—for I do not know this either. I wish merely to insist that *our profound ignorance of the pharmacology of sulfocyanate should prevent us from proceeding empirically in its therapeutic use without due regard for considerations more immediately important, possibly, than those of preventing or curing or alleviating dental caries by such dubious means.* (Page 51.)

It was also said in that report:

Your society has given considerable attention to sulfocyanate, chiefly from the standpoint of the possibility that salivary sulfocyanate prevents, inhibits, retards, or delays the onset and progress of dental caries. If salivary sulfocyanate is an *excretory* product, as I have suggested, such a prophylactic relation to dental caries is improbable. The available experimental data on the subject of an inhibitory influence of sulfocyanate on plaque formation are not only discordant, but cannot be applied satisfactorily to oral conditions. No *rational* explanation has been offered for the supposed effects of sulfocyanate, in salivary proportions, on the formation of bacterial plaques or on bacterial growth or activity. Our studies under your auspices* have convinced me that sulfocyanate does not, and, in the proportions of its occurrence in saliva, *cannot* appreciably retard the growth of oral bacteria, or impair their nutrition, or reduce their capacity to produce acid from carbohydrate. I believe that the ease with which sulfocyanate may be detected in the saliva, and the striking and attractive nature of the test, have given sulfocyanate an importance it does not deserve. (Page 50.)

In our report a year ago, as has just been said, we expressed the belief that the reported therapeutic use of sulfocyanate *had not been warranted by definite knowledge of its effects* and that its actual medicinal employment had been without influence on dental caries. Nevertheless, the earnest argument, by a former research committee of your society and by a number of dentists, in behalf of the therapeutic use of sulfocyanate (largely on the basis of "results"), led us to propose an extension of our preliminary toxicological study to observations on the *pharmacology* of sulfocyanate.†

In concluding our reference to this matter a year ago, we said:

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* Seaman and Gies: *Dental Cosmos*, 1910, lii. p. 1141.

† The *details* of the toxicological work to which we referred, generally, in our report a year ago were published by Kahn: Dissertation (Ph.D., Columbia University, 1912), pp. 83 (May 18th).

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Our results strongly suggest an extension of this work along the several lines I have indicated. They emphasize especially the need for thorough determinations of the hidden effects of doses of sulfocyanate that produce no gross toxic symptoms—doses given to mammals, and particularly to men who would volunteer to submit to such treatment, after its possible dangers were clearly and fairly indicated. (Page 53.)

We have been conducting such a study, which, we regret to say, has not been completed in all its projected parts. Thus far, however, our results warrant the following general conclusions:

(1) *Therapeutic* doses of sodium sulfocyanate (in cats and dogs under anesthesia) were practically without effect on respiration, heart-rate, blood pressure, secretion of saliva, secretion of bile, and excretion of urine.

(2) Daily *therapeutic* doses of sodium sulfocyanate (in three men under daily observation for from two to three weeks at a time in each case) induced no unfavorable effects on heart-rate or blood pressure.

(3) The sulfocyanates of sodium and potassium, in therapeutic proportions, exerted no appreciable systemic action. The observed toxicity of the potassium salt in such doses was due solely to the potassium ion.

All the pharmacological experiments on which these three general conclusions are based were performed by Professor Lieb in the pharmacological laboratory of Columbia University, at the College of Physicians and Surgeons, by the best pharmacological methods and with apparatus of the most delicate kind. The speaker repeatedly witnessed the procedures, co-operated in some of the tests, and was one of the subjects in the experiments on men.

All estimations of the effects of sulfocyanate were preceded by preliminary periods of corresponding observation for the establishment of "normal" or "control" values.

Condensed memoranda of these pharmacological experiments are substituted below for the more detailed statements in the speaker's oral report at Albany. The details of the experiments, which would carry this long report beyond a reasonable extension, will be published in one of the pharmacological journals in the near future, and a synopsis of that paper will be offered to the *Dental Cosmos* for the convenience of the readers of this report.

(A) Experiments on Animals.

1. *Blood pressure.* Blood pressure was recorded by a mercury manometer connected with the carotid artery. The salt solutions were of the same freezing-point as the blood and were injected intravenously.

Cats were anesthetized with either Hanzlik's anesthetic, Grehant's anesthetic, or ether. KSCN, 10 mg. per kilo, produced an initial fall in blood pressure followed by prompt compensation. This change was comparable to that following the intravenous injection of a corresponding amount of KCl. NaSCN, 10 mg. per kilo, produced a very slight initial fall in pressure, followed by a more than compensatory rise, which was maintained for from three to five minutes. *Toxicity:* Increasing doses of NaSCN up to 360 mg. per kilo, within an hour, were non-toxic to the circulation. About 100 mg. of KSCN, or of 77 mg. of KCl, per kilo, caused death from cardiac paralysis.

Dogs were anesthetized with morphine and chloretone. KSCN produced no effect in doses less than 4 mg. per kilo.

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After a larger dose there was an initial fall in blood pressure followed by a compensatory rise, with return to normal within a few minutes. Similar effects resulted from the injection of corresponding amounts of an equimolecular solution of KCl. NaSCN, in doses greater than 10 mg. per kilo, produced an initial fall in blood pressure followed by a compensatory rise, with return to normal within a few minutes. *Toxicity:* A single injection of 100 mg. per kilo produced changes that were no more marked than those following an injection of 20 mg.

2. *Heart-rate.* During the initial fall in blood pressure, in the experiments referred to in the foregoing memoranda, the heart-rate was increased, to be slowed during the secondary rise, returning to normal with the blood pressure. This change in rate is present after the administration of atropin, and is probably secondary to the changes in blood pressure.

3. *Myocardiogram* (1, 2, above). KSCN: The changes following the injection of KSCN resembled those produced by KCl. NaSCN: After the injection of NaSCN, the changes followed the blood pressure, the excursions being greatest during the fall in blood pressure. The administration of daily doses of 100 mg. per kilo for six days did not affect in any way the circulatory response to KSCN or NaSCN.

4. *Turtle heart.* KSCN: On the turtle heart, a few drops of an isotonic KSCN solution produced changes that duplicated those produced by an equimolecular solution of KCl. NaSCN: No effect.

5. *Arteries* (ox). On isolated coronary and carotid arteries, KSCN, in solutions varying in concentration from 14 to 142 in 50,000, produced slight relaxation followed by secondary constriction, which became more marked when the drug was replaced by Ringer solution.

6. *Isolated intestine* (rabbit). KSCN (1:1000 in Ringer solution) caused an increase in tonus, such as followed treatment with KCl. NaSCN had practically no effect on rate of contraction or on tonus.

7. *Central nervous system* (frog). On the central nervous system of frogs, in doses of from 0.125 mg. to 1.5 mg. per gram. of frog, NaSCN or KSCN produced convulsions of the strychnine type. The initially increased reflex excitability was followed by paralysis of the central nervous system (see *Biochemical Bulletin,* 1913, ii, p. 459).

8. *Excretion of urine* (dog: 1–3). The excretion of urine varied directly with the changes in the blood pressure. The observed small total increase of urine also followed the injection of an equal quantity of another salt in equimolecular solution, and was due solely to the "salt action."

9. *Secretion of saliva* (dog). Neither NaSCN nor KSCN, in doses of 10–100 mg. per kilo, had any effect on the rate of salivary secretion.

10. *Respiration* (cat and dog: 1–3, 8, 9). Neither the rate nor the depth of respiration was changed in the slightest degree.

11. *Elimination of* R—SCN. Within a very few minutes after intravenous injection of sulfocyanate, the substance could be recognized in the saliva, and its *increased* output in bile and urine detected. In one experiment the quantity of sulfocyanate in the bile increased 100 per cent. within a few minutes after the

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CHART 1. EFFECT OF NaSCN ON BLOOD PRESSURE.

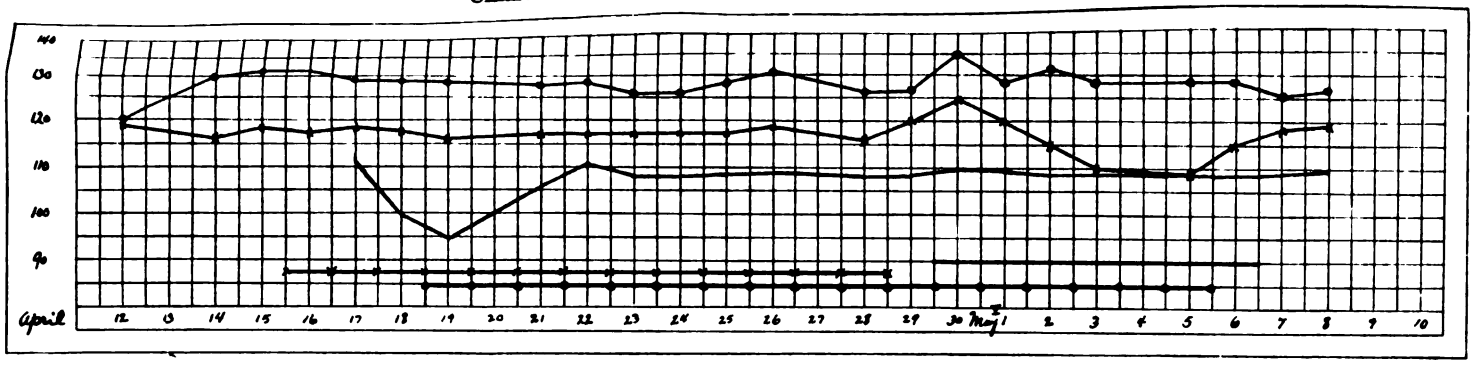
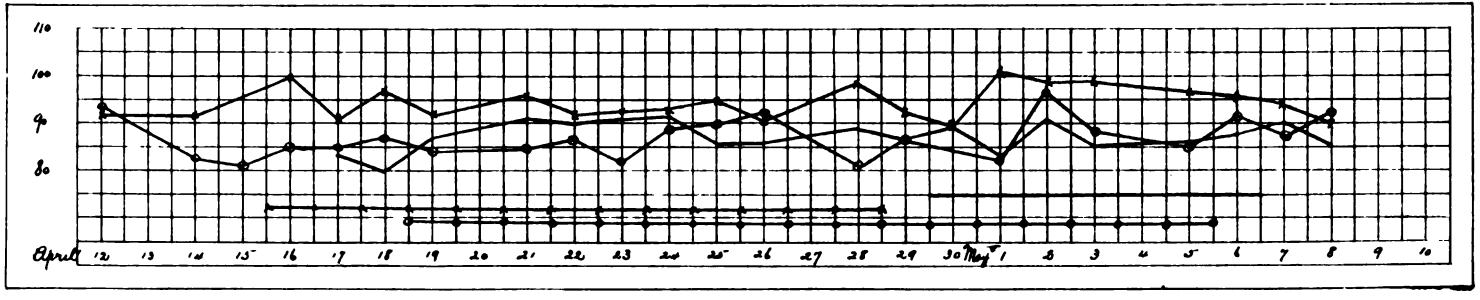


CHART 2. EFFECT OF NaSCN ON HEART-RATE.



Subjects: _____ W. J. G. —o—o— E. G. M. —o—o— A. K.

Straight heavy lines indicate the days of dosage.

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injection—a fact in striking accord with our conclusion that the liver excretes sulfocyanate.

(B) Experiments on Men.

12. *Blood pressure.* The usual precautions were taken *to prevent the modifying influence of cerebral excitement, and of all other controllable extraneous factors.*

13. William J. Gies (first test). NaSCN: 35 mg. (½ grain) taken daily, immediately after breakfast, for seven days. Blood pressure was recorded about two hours after the ingestion of the drug (April 17th–May 8th). An ordinary cold, attended with diarrhea, from April 17th to 21st, were the only evidences of abnormality during the experiment. (May 2d was a very warm day. See the accompanying charts.)

Control period (12 days): Blood pressure between 106 and 112 (average 108). NaSCN period (7 days): Blood pressure between 106 and 112 (average 108). "After" period (2 days): Blood pressure between 106 and 110 (average 109).

14. William J. Gies (second test). KSCN, first period; 150 mg. (2½ grains) taken daily, immediately after luncheon, for five days. Then, on the eighth day (second period), one dose of 200 mg. (3 grains) was taken. Blood pressure was recorded about four hours after the ingestion of the drug. (August 11th–18th.)

Control period (2 days): Blood pressure between 106 and 110 (average 108). KSCN, first period (5 days): Blood pressure between 106 and 114 (average 108). KSCN, second period (1 day): Blood pressure 106.

15. Arthur Knudson. NaSCN: ½ grain combined with 2 grains of hydrastis (Dr. F. W. Low's sulfocyanate-hydrastis tablets), were taken each night for two weeks. Blood-pressure was recorded at 2 P.M. (April 12th–May 7th).

Control period (6 days): Blood pressure between 120 and 132 (average 128). NaSCN period (17 days): Blood pressure between 126 and 135 (average 127). "After" period (3 days): Blood pressure between 124 and 128 (average 127).

16. Edgar G. Miller, Jr. NaSCN; ½ grain combined with 2 grains of hydrastis (Dr. F. W. Low's sulfocyanate-hydrastis tablets), were taken daily after breakfast for eleven days. Blood pressure was recorded at 2.30 P.M. (April 12th–May 7th).

Control period (3 days): Blood pressure between 115 and 120 (average 118). NaSCN period (13 days): Blood pressure between 116 and 120 (average 118). "After" period (9 days): Blood pressure between 108 and 120 (average 116). (The low blood pressure occurred on days during which the patient suffered from tonsillitis.)

17 *Heart-rate.* William J. Gies (13) (first test). NaSCN: 35 mg. (½ grain) taken daily immediately after breakfast for seven days. Heart-rate was recorded about two hours after the ingestion of the drug (April 17th–May 8th).

Control period (12 days): Heart-rate varied between 86 and 98 (average 86). NaSCN period (7 days): Heart-rate varied between 82 and 98 (average 86). "After" period (2 days): Heart-rate varied between 84 and 92 (average 88). (The rates above 92 were preceded, in each instance, by rapid walking back and forth in the laboratory due to emergencies that had to be met in this way in spite of plans to the contrary.)

18. William J. Gies (14) (second test). KSCN, first period, 150 mg. (2½ grains) taken daily, immediately after luncheon for five days. Then, on the eighth day (second period), one dose of 200 mg. (3 grains) was taken. Heart-rate recorded about four hours after ingestion of the drug. (Aug. 11th–18th.)

Control period (2 days): Heart-rate varied between 71 and 74 (average 72). KSCN,

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first period (5 days): Heart-rate varied between 67 and 79 (average 74). KSCN, second period (1 day): Heart-rate varied between 76 and 77 (average 76).

These tests were made late in the afternoons of days which the subject devoted *continuously* to lectures and laboratory work at the close of the summer session at Columbia University, in August 1913. Delay in the publication of this paper made it possible to conduct this special experiment with the *potassium* salt, under conditions that were particularly favorable for the elicitation of any serious effects that fairly large doses of sulfocyanate might be able to induce in such tests. It may be safely assumed that, at that time of the year and under the exhausting conditions referred to, the subject would have been specially susceptible to any systemic influences the doses taken might have been able to exercise.

19. Arthur Knudson (15). NaSCN: ½ grain, combined with 2 grains of hydrastis, were taken nightly for two weeks. Heart-rate was recorded at 2 P.M. (April 12th–May 7th).

Control period (6 days): Heart-rate varied between 80 and 94 (average 84). NaSCN period (17 days): Heart-rate varied between 80 and 92 (average 86). "After" period (3 days): Heart-rate varied between 86 and 92 (average 88).

20. Edgar G. Miller, Jr. (16). NaSCN: ½ grain, combined with 2 grains of hydrastis, were taken daily after breakfast for eleven days. Heart-rate was recorded at 2.30 P.M. (April 12th–May 7th).

Control period (3 days): Heart-rate, 92. NaSCN period (13 days): Heart-rate varied between 90 and 100 (average 94). "After" period (9 days): Heart-rate varied between 88 and 94 (average 96).

21. *Opinions expressed by the subjects.* The men involved in these tests (13–20) were unable to detect any subjective symptoms or any systemic effects.

The speaker, himself a subject (13, 14, 17, 18), took each of his doses dissolved in water, and experienced no effects whatever except the unpleasant taste of the more concentrated solutions. In view of the speaker's fear, as expressed a year ago, that such doses might be harmful, his negative personal *experience* is particularly instructive. He couldn't even *imagine* that he felt any general effects! He noted that his saliva, perspiration nasal secretions, and urine gave unusually strong ferric chlorid tests for sulfocyanate during the dosage periods. The sulfocyanate was rapidly excreted. There were no "after-effects," either in systemic symptoms or in responses to the ferric chlorid test for sulfocyanate.

22. *Graphic representation of the "daily average" data.* The accompanying charts (1 and 2), which are self-explanatory, show graphically the generally negative character of the findings.

VII. Summary of General Conclusions.

Sulfocyanate arises in the body from proteins and other substances that yield —CN and —SH radicals. Its quantity in any part of the body appears to depend primarily upon the available metabolic supply of —CN radicals.

The liver appears to be the chief site of sulfocyanate synthesis. The process of production in the liver seems to be essentially one of detoxification (defense) prior to excretion of sulfocyanate in bile and urine, as in the case of the conversion of indol into indican and the urinary elimination of the latter.

The radicals involved in the production of sulfocyanate are evidently of

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both exogenous and endogenous derivation under ordinary circumstances.

Saliva normally contains excretory substances. Salivary sulfocyanate appears to be wholly excretory in character and significance. After the administration of sulfocyanate it is promptly ejected through all the secretory channels including the salivary glands. Dog saliva, which is normally free from sulfocyanate, contains sulfocyanate in abundance after its systemic introduction, just as human saliva contains excretory alkali-iodid soon after the gastric administration of the latter.

There is nothing about the *known* qualities of sulfocyanate to indicate that sulfocyanate is able, *in the proportions of its normal occurrence in saliva,* to affect the secretory tendencies of the salivary or buccal glands, to modify the oral membranes, to influence the teeth from any standpoint, or to stimulate or retard or alter the activities of the oral micro-organisms. To attribute to sulfocyanate any such power is to do so empirically and without any present evidence in support of such an opinion.

The proportions of sulfocyanate that normally occur in the blood, lymph, tissues, secretions, and excretions appear to be wholly devoid of toxic or physiological effects.

Doses of sodium sulfocyanate equal to or greater than those which Low and others have recommended, did not cause toxic effects under the conditions of the experiments described in this report. Our results indicate that the doses of sodium sulfocyanate which Low has recommended and used may be taken daily by normal adults, for comparatively long periods, without any danger.*

The speaker's apprehensions in this regard, as stated a year ago, were unjustified, but his caution was warranted.*

We recommend, if you desire to continue the study of sulfocyanate, that you proceed from the *clinical* standpoint. We suggest that the matter be investigated by *practicing dentists* in an effort to determine, by concerted inquiry, whether certain beneficial effects on the teeth, which have been ascribed to sulfocyanate medication, can be confirmed and obtained under conditions both definite and suitable, that would warrant scientific conclusions from the resultant data.

We wish to remind you, in conclusion, of the possibility—of the great probability, in fact—that dental caries, as the speaker† has suggested on various occasions, is not dependent solely upon superficial oral conditions, but is determined to some extent at least by systemic influences. Erdheim‡ found that when

* Shortly after the completion of the pharmacological experiments described in this report we received from Dr. Franz Müller (Charlottenberg) a reprint of a very valuable paper by Dr. Fr. Franz, entitled: "Beitrag zur Frage der Giftigkeit der Rhodanalkalisalze" (*Arbeiten aus dem Kaiserl. Gesundheitsamte,* 1912, xxxviii, p. 435). We are indebted to Dr. Müller for co-operating with us in this manner. Dr. Franz' results led him to the conclusion at which we ourselves have arrived, viz, that small doses of sulfocyanate are devoid of toxicity.

* Kobert ascribed convulsions in, and death of, a woman to a dose of 5 grains (0.3 gm.) of ammonium sulfocyanate ("Lehrbuch der Intoxikationen," 1906, ii, p. 861). Although Kobert's remarks regarding this fatal outcome do not make it certain that death did not result from another cause, his statement required due consideration. This was but one of the many reasons for fear that dosage with sulfocyanate might be harmful. *We do not know that such dosage is harmless in unhealthy people.* Our experiments were conducted upon healthy vigorous individuals.

† Gies: *Journal of the Allied Dental Societies,* 1912, vii, 214.

‡ Erdheim: *Frankfort Zeitschrift für Pathologie,* 1911, vii, p. 178.

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the parathyroids were extirpated from a young rat, its incisor teeth became liable to repeated fracture. Calcification of the dentin ceased at once, more or less completely; the portion already hardened remained unaltered, but as use wore down the older part, the new uncalcified dentin that took its place lacked strength, and fractures followed. *Imperfections in the enamel deposit also occurred,* though at a later period than the alterations in the dentin. By regulating the time between extirpation of the glands and examination of the teeth, all transitional stages between normal teeth and teeth almost completely decalcified could be obtained.* Observations of this kind emphasize the need for studies of the relationship of systemic conditions to dental caries, and we recommend the inauguration of such work under your auspices.

We are very greatly indebted to Dr. E. G. Miller, Jr., and Mr. Arthur Knudson, assistants in the Biochemical Laboratory, for their very effective co-operation, as subjects, in the pharmacologic experiments.

*Unavoidable delay in the publication of this report enables us to refer, for more detailed discussion of this matter, to the recent papers by Lothrop and Gies, in the *Journal of the Allied Dental Societies* (1913, viii, p. 323), and Kirk, in the *Dental Cosmos* (1914, lvi, p. 1). The Research Committee has approved our plans for studies of the influence of "*internal* secretions" (secretions from the *ductless glands*) on the quality of the teeth. Work relating especially to the influence of the parathyroids was inaugurated in October, in the Biochemical Laboratory, with the co-operation of Dr. Sergius Morgulis.—W. J. G.

DISCUSSION.

Dr. F. W. Low, Buffalo. As a preliminary, I would say that I was rather disappointed recently in receiving a letter from Dr. Gies informing me that sodium sulfocyanate in therapeutic doses was harmless. Last winter I received from Dr. Max Kahn, who is one of Dr. Gies' assistants at Columbia, a very instructive pamphlet telling of the history of the investigations regarding potassium sulfocyanate and many of the experiments that Professor Gies made during the year 1912, and Dr. Kahn finished with the conclusion that potassium sulfocyanate *was toxic* to animal and vegetable life; that its toxicity was so great as to make it dangerous to prescribe indiscriminately! Therefore I came to this meeting ready for a tilt with Professor Gies, and prepared a discussion that I will not now read, because of his conclusion presented this morning, viz, that sulfocyanate in therapeutic doses is harmless. This disposes of one-half of the contention over which we implacable belligerents have been so determinedly at variance.

The first question I now want to ask Dr. Gies is, If the sulfocyanates as found in the saliva constitute only a waste product—that is, a waste product of the liver—and are not of any functional use, why did the Almighty plan that it should go around and around in the saliva, through the stomach again and again, instead of being eliminated

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through the feces and urine? The dog, I believe, does not have any sulfocyanate in the saliva, but eliminates it all from the stomach through the feces, and if it is of no biologic value in the saliva of man, why do not we eliminate it like the dog?

As to the question of whether or not the pharmacological dose will do any harm, I will say that when I thought it was intended that I should be gibbeted and possibly drawn and quartered here today, I had secured evidence that one young man in Europe, according to one of the reputable medical journals of Europe,* swallowed at one dose a whole ounce of *ammonium* sulfocyanate. He vomited after fifteen minutes and again in six hours, after which he felt giddy for a few hours, and later eliminated great quantities of sulfocyanate in the urine and feces for two weeks. After this, he returned to a normal condition. I have made one experiment that I consider of value upon a grown individual, and I had hoped to have him here, but his mother's health was such that he could not come. In this connection, I wrote Dr. Gies recently that I was better off than the old darkey doctor who, in reply to a question as to his success in his work said, "Yes sir, Mr. Johnson, I have had a great deal of success; out of the seventeen patients what I have treated this year, only thirteen have died, and *not one of them* died of the disease what I was treating 'em for."

One other matter only I wish to speak of, and that is, I have had a visit with Dr. Gies today, and I am going to make experiments to determine the viscosity of the saliva both before and after the sulfocyanate treatment, also tests to show whether the alkalinity and acidity of the saliva are affected by this medication.

I have here forty postal cards that I have received from patients, but I do not dare read them to you, first, because it would take too long, and also because, as Professor Gies said when he read them over this morning, they sound so much like patent medicine advertisements. The suggestion was made by Professor Gies last year that I should not report one or two favorable cases, but all that I could get. In the six years that I have been following this treatment I have had only seventy-one or seventy-two cases in which I have found it necessary to administer sulfocyanate, and I sent out sixty cards to these patients. Some of them had died [laughter], but not more than thirteen; some had married and moved away. I sent out return postal cards to these patients asking them the following questions:

(1) Do you recall the circumstance of having taken some little tablets during the month of July 1908, which I prescribed for the purpose of correcting an excessively ropy or stringy condition of your saliva, which I thought was bad for your teeth?

(2) At the time I asked you to observe from day to day as the medication progressed, until all the tablets were taken, whether the saliva gradually became less thick and mucinous. Can you remember now whether you thought at the time that any improvement was noticeable on account of that treatment?

The first card that I received was significant—it came from the dead-letter office. [Laughter.] The next one I received said that the patient had not noticed any difference; then five or six followed from patients who could not remember. One or two could not remember exactly about the conditions at the time of treatment, but said that, in a general way, they were aware that the

* See report of Dr. O. Adler in the *Deutschc med. Wochenschrift*, 1910, No. 48, page 2271.

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saliva was very much improved, and the rest pronounced eulogies that my modesty would not permit me to read here.

It may be said that lay patients are not competent to tell whether their saliva is better or worse. Professor Gies wrote about that, but you will notice that I asked the patients whether they noticed a more or less stringy or ropy condition of the saliva, and I claim that a layman can tell whether or not he is spitting shoestrings, and that was the question that determined in my mind whether they were getting better or not. Dr. Gies says that the sulfocyanate has no effect on the teeth. I believe that it has, because it has *some* effect upon the system of the individual, but even more upon the metabolism of the bacteria in the mouth whereby they are stimulated; and while we found that they did grow more rapidly when they had been stimulated with the potassium sulfocyanate, yet we hoped that the stimulation was such that they did not feel the necessity of throwing out a protective cover, thus doing their mischief under the plaque such as has been described by Dr. Black.

G. Treupel and A. Edinger (*Muenchener med. Wochenschrift,* Nos. 21 and 22; and the same, 1901, No. 31, and 1902 No. 14) have made exhaustive investigations on the physiological action of the sulfocyanates, and arrive at the conclusion that doses of 0.3 to 0.5 gm. (4½ to 7½ grains) of sodium sulfocyanate are borne very well by human beings. The continued use of this salt considerably reduces the acidity of the urine and diminishes the amount of uric and phosphoric acid eliminated. If its administration reduces acidity of urine, why should it not be able to reduce that of the saliva—my experiments so indicate.

I am next going to ask Dr. Gies if he has made any experiments to ascertain the physiological effect of potassium sulfocyanate upon the bacteria of the human mouth. In the test-tube cultures experimented with, did the presence of sulfocyanate stimulate rapidity of growth?

I have always disputed Dr. Kirk in his contention that the only reason why chlorid of iron, if administered by the stomach, does any harm to the teeth is because of the local effect of the acid constituent of the iron coming in contact with the teeth. I dispute that, and I believe the reason why it does harm is because it takes potassium sulfocyanate out of the saliva and gives the bacteria a better chance. Dr. McCoy is present, and I wish he would cite his experience in taking the different preparations of iron.

Dr. W. H. McCoy, Buffalo. A few years ago Dr. Low made a test of my saliva and found it rich in sulfocyanate, and I felt glad to think I was in no danger of suffering from rapid caries, having had very little trouble with my teeth previous to that time. About a year ago I became anemic, which necessitated my taking iron, which was administered hypodermically, the solution used being a combination of citrate of iron, arsenic, and strychnin.

After being treated for ten days, Dr. Low made a second test and found my saliva had faded out to a No. 2 color, which is considered very light, and shows a decided lack of sulfocyanate. I discontinued the hypodermic treatment for a while and took chlorid of iron through the stomach. Another saliva test was made, which showed a slight increase in sulfocyanate. From these tests I conclude that iron passing through the

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mouth and coming in contact with the teeth does not cause rapid caries, but this effect is produced by the iron reducing the amount of sulfocyanate in the system.

Dr. H. C. FERRIS, New York. It would seem as if Professor Gies' experiments were conclusive on this subject, but my clinical experience does not agree with his findings. It is possible that my work was not as accurately done, but I have sufficient confidence in my own ability in the handling of a sphygmometer to have the courage of my convictions. It is not a difficult procedure to record the blood pressure with the improved instruments of today, and anyone of average skill can make an accurate reading. I have made hundreds of these examinations, and my findings upon patients treated with sodium sulfocyanate have shown in every case an increased blood pressure. It is probable that these findings may have been due to the chemistry of consumed food, but if that is true in my experience, it would also be true in the experience of Professor Gies, in inverse order.

I have also noted in diabetic cases that a urinary specimen that was as thick as molasses would become clear in the course of forty-eight hours, with no other medication. If this drug is an inert product, and has no physiological influence upon the system, I would like to have Professor Gies explain how this might occur. I would like also to ask Professor Gies if, in his examinations of these men and himself, the salivary analysis was made before and after the treatment, or during the period of the treatment, and if so, whether any centrifuged solids were recorded.

I have in mind the history of a case that I treated with extreme care, and in which the diet was rigorously observed, and my observations were check-tested by Dr. C. E. Scofield of Brooklyn. The results of this case I published a year ago in the Transactions of the State Society. That there were physiological manifestations in this patient was a positive fact, and as a result of my experience in a number of other cases, I am not convinced but that there may be some point in Professor Gies' experiments that has been overlooked.

Dr. LOW. What were the physiological effects precisely?

Dr. FERRIS. Those published a year ago were upon the blood pressure and the centrifuged solids in the urine.

Dr. LOW. What were your doses in the recent case you reported? Were they three grains a day?

Dr. FERRIS. One-half grain at a dose.

Dr. LOW. You gave the doses more than once a day?

Dr. FERRIS. Yes, two or three times a day. Blood pressure was so affected when the patient returned in three days, that the reading of the instrument was nine degrees higher, and she complained of fulness in the face and head, and asked if I thought she should continue the treatment. I told her to stop it, and in another twenty-four hours the blood pressure was reduced to its original condition.

I hope we may have more experimental work upon human beings before we consider this drug in the light of Professor Gies' report.

Dr. J. W. BEACH, Buffalo. I would like to say a word in commendation of the report which Professor Gies has given us this afternoon. It marks a period of something tangible; it has reached the point where we have something decisive to work on. Heretofore the work

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of Dr. Low has been as scientific as the means at his command allowed, and his results have been produced and his conclusions have been reached in an honest and fair way, which is characteristic of everything he does, and these results have been gratifying to me. I have been intimately associated with him, not as a collaborator but in watching his work, and at its initiation I was drawn into it. Possibly I may have prescribed sodium sulfocyanate as much or more than Dr. Low in my own practice, and I have felt all along that I have had tangible results. Of course, this treatment was not based upon scientific principles which would stand, but my results were gratifying. I have passed through all the stages of the effect of the administration of sulfocyanate on the tissues. It is the environment of the teeth that we refer to in its beneficial effect, and not any positive action on the tooth structure itself; it merely changes the conditions, which results in benefit to the teeth and mouth generally. Of course "the proof of the pudding is in the eating," but I am especially gratified that Dr. Gies has been able to bear out Dr. Low's work to the point that potassium or sodium sulfocyanate is not harmful to the individual. This finding enables us to begin on a scientific basis, and I trust that Professor Gies will be able to carry us along farther, and to bear us out scientifically in what we have been doing in the past in an empirical way.

Dr. L. M. WAUGH, Buffalo. The report to which we have listened must be accepted by us as being conclusive so far as it goes. I feel with Dr. Ferris, however, that it may not go quite far enough. Scientific facts are of practical value only as they bear out the conditions that we see every day, and for that reason I will argue in favor of further work in this particular field of investigation. I know that Dr. Low has been somewhat disappointed in my position in connection with the potassium sulfocyanate administration. Five years ago, when I was chairman of the committee, we tried to decide the influence of potassium sulfocyanate on bacterial plaque formation in test tubes, and Professor Gies, when he first did that work, repeated the experiments under somewhat better conditions, but, possibly because of lack of knowledge of dental conditions, he did not get the result we obtained. We did what we could to verify our conclusions with laboratory work, but the results which Dr. Gies produced largely contradicted our findings. Personally, I administered sulfocyanate to a few patients, and there was a coincident improvement in their mouths, but I could not quite make up my mind as to whether the improvement was due to the medicine or to the fact that my enthusiasm had stimulated the patient to take better care of his teeth, although I aimed to avoid this. I have never said this to Dr. Low, but I could not feel convinced that sulfocyanate might not in some way perform some function in the body other than what we knew of, but now that Dr. Gies has told us that it does no harm, I am ready to administer it further. While I realize that, as Dr. Gies says, we cannot control this in practice as is done in research work, yet as we administer this drug to patients in our practice, it will be used under the conditions in which the dental profession will have to administer it.

Dr. Gies has suggested that perhaps the reason why we always found a better

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condition of the mouth after administering sulfocyanate might be the fact that the patient was then under dental treatment. Dr. Flagg showed years ago that there are periods of susceptibility and comparative immunity to caries. The susceptible ages are during adolescence, from thirty to thirty-five years, forty-five to fifty years, sixty to sixty-five years, and senility, the intervening years being periods of slow progress. I have watched this in practice, and it is surprising to what extent this statement is borne out in the average patient's mouth. Dental caries is attributable to two causes, one exciting, the other predisposing. We know the exciting cause to be the growth of bacteria which form plaques, and the one important factor which we do not generally recognize is that the exciting cause is largely dependent upon the predisposing. The predisposing cause is the problematic part, and, according to Black, may be either a temporary lack of oral hygiene or some constitutional condition which so modifies the constitution of the oral fluids that it will favor the formation of the bacterial plaque. That is a problem to which Dr. Gies alludes today, and we want to get at the conditions which will bring about the change in the oral fluids which will favor immunity to caries, or retard the exciting cause of bacterial plaque formation. I do not believe that it is merely the fact of dental treatment being instituted that is responsible for stopping these conditions, for we find that caries still goes on in many mouths, in spite of all we can do to prevent it. It is something more than the condition of the mouth merely —it is a constitutional condition which modifies the oral fluid, and I think it is in that direction that we must continue the work.

Last year the Correspondent brought in a report on the administration of iron. Our schools had taught that iron in itself was not harmful to the teeth, but that iron preparations that were acid in reaction are harmful in their action upon the enamel. Dr. Truman said he believed that not only acid preparations of iron but iron itself modified the constitution of the saliva, and I thought of what Dr. Low told us, that, when iron is given, sulfocyanate passes from the saliva, and it may be in that respect that iron can be productive of harmful results.

The one hopeful feature of this whole discussion is that no matter what the final result may be, we have made some advancement in the matter of research and are gradually approaching the truth. As a member of the committee I hope that Dr. Gies can see his way clear to go farther with his investigations of potassium sulfocyanate by administering it to humans, and checking its effect upon the chemistry of the oral fluid.

Dr. GIES (closing the discussion). Referring first to the concluding remarks by Dr. Waugh, let me remind you that I have formally suggested that any further study of sulfocyanate, under your auspices, be put in the hands of practicing dentists. Our results have taken this sulfocyanate research out of the laboratory, so to speak, and put it into the dentist's chair. I am not competent to undertake the clinical study I have suggested, because I know too little of the clinical aspects of dentistry. I should be happy, however, to suggest conditions, among others, on which such a clinical study might profitably be based

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and conducted. If you have faith in the possible curative powers of sulfocyanate, by all means put the possibility to a thorough test—ignore all we have suggested! Even if you do not have such a faith, it would be well to settle this therapeutic question once for all by subjecting it to a rigorous clinical test. I suggested this a year ago. I again advise it, and should cheerfully co-operate from advisory and critical standpoints, if I could be of service to you. Expert dentists who believe in the sulfocyanate treatment, and others who do not, should be encouraged to proceed with co-ordinated efforts to solve the problem.

Dr. Ferris has failed, apparently, to distinguish between the mechanical ease with which blood pressure may be ascertained at a given moment in a particular individual, on the one hand, and the clinical difficulty, on the other, of preventing the incidence of influential though unrecognizable factors that complicate the significance of a prevailing degree of pressure. Anybody can look through a telescope, but how many such are astronomers? I stated in our report that the blood-pressure determinations were made by my colleague, Professor Lieb of the Columbia department of pharmacology, who has been specially trained for such work, and gives all his time to it. As to Professor Lieb's professional capacity, I wish to quote the following remarks, with which Professor Bastedo concludes the preface to his splendid text-book on "Materia Medica, Pharmacology, and Therapeutics": "For the use of a number of tracings I owe my deepest thanks to my colleague, Prof. Charles C. Lieb, whose care about the details of an experiment and accuracy in recording results I believe to be unsurpassed." Professor Lieb is well known as a particularly competent pharmacologist.

Instead of suggesting that a trained pharmacologist has "overlooked some point" in a technical pharmacological study, I believe it would be more logical for Dr. Ferris to intimate that probably he himself, the trained dentist, "overlooked some point" in a field of study for which he appears to have no special training or aptitude. It is better for each of us to "stick to his last" than to "stand by his guns" in science.

I do not know what Dr. Ferris means when he suggests that "it is probable his findings may have been due *to the chemistry of food.*" He certainly is wrong, in spite of his modesty, when he suggests that "what is true in his experience [in this connection] would also be true in the experience of Professor Gies, in inverse order."

Dr. Ferris inquires whether the salivary analysis was made before and after or during the period of treatment of Messrs. Miller, Knudson, and myself, and if so, whether any centrifuged solids were recorded. During the period of treatment we deliberately attended solely to pharmacological matters in this connection. The collection of saliva, in quantities sufficient for adequate salivary analysis, might have introduced such influences on each subject as we sought particularly to obviate. There were no effects on my own saliva that attracted my attention, though I was alert for them. I have already said that the sulfocyanate content was increased after the treatment. "Centrifuged solids" were *not* recorded. Even if saliva had been available for systematic analysis, we should have been unwilling to waste time on a method which is as crude and useless as the centrifugation process for

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the comparative quantitative determination of "solids" [particles] of different degrees of density, in a changeable secretion of variable viscosity. Counting the air-bubbles, per unit of volume, would probably be as useful—and that certainly would be physiologically meaningless.

Dr. Ferris states that he has also noted in diabetic cases that a urinary specimen that was as thick as molasses would become clear (!) in the course of forty-eight hours, with no other medication than dosage with sulfocyanate, and then asks, "If this drug [sulfocyanate] is an inert product and has no physiological influence upon the system, I would like to have Professor Gies explain how this might occur." I should wish to witness these phenomena before trying to give the answer. I think of Mark Twain's comment in another connection when he said, "Important, if true." I do not understand how all this could be true of *a* urinary specimen. Besides, how thick is "thick as molasses?" This is about as scientific a phrase as the expression "heavy as wood" or "hot as water." Dr. Ferris says nothing in this connection of the nature and quantity of the daily diet, or the amount of water taken per day. Besides, if he gave doses large enough and frequently enough to elicit ordinary "salt action," perhaps the sulfocyanate induced diuresis and also the mechanical change to which he alludes.

There is nothing in Dr. Ferris' statement to indicate that the patients he mentions were adequately controlled for the conclusions he announces.

My good friend Dr. Low, and I, have not yet recovered from the habit of disagreeing with each other, but I think we are giving strong evidence of a tendency to improvement in that direction. It is a great personal pleasure to say today that, in the light of our experimental results, there is good reason for thinking that Dr. Low's use of sulfocyanate for intended therapeutic purposes has not done any harm to anyone. In retreating to this point from the judicial position taken a year ago, I do so in accord with and forced by our experimental findings. In view of the benefit to humanity that would accrue from any real prophylactic utility which sulfocyanate might possess, I hope I may have the pleasure next year, as a result of further discovery, of retreating the rest of the distance to Dr. Low's camp; although, as I size up his position today, through the same old telescope—"show me"—I think I see "faith cure" in large letters over the opening in his tent, and the doctor himself the personification of Faithful rather than Factful.

The pamphlet by Dr. Kahn, to which Dr. Low refers, was written before our report was presented to you a year ago. It gives the toxicological results in more detail than our report to you offered them. The results fully warranted the fears that were then expressed. Our later pharmacological study, with much smaller doses, removed that fear so far as therapeutic doses in healthy people are concerned. Dr. Low should not forget the fact that last year his basis for the opinion that his recommended doses of sulfocyanate were harmless was a statement in a trade journal (Merck's).

Dr. Low states that Treupel and Edinger found that the continued use of sodium sulfocyanate "considerably reduces the acidity of urine and diminishes the amount of uric acid and phosphoric acid eliminated!" But such effects are undesirable! Dr. Low further inquires,

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"If its administration [sodium sulfocyanate] reduces acidity of urine, why should it not be able to reduce that of the saliva?" There is no physiological point in this. Dr. Low might as well ask, If the ingestion of physiological amounts of sodium chlorid facilitates the maintenance of the normal acidity of gastric juice [which it does], why should it not be able to maintain that of the saliva [which it does not].

Dr. Low has put me in a very embarrassing position by insisting that I reveal to you the reason why the "Almighty planned that sulfocyanate should go around and around in the body," instead of being ejected directly and immediately. It is evident that Dr. Low has learned in some way that I am fully informed of the Almighty's plans, but why he should wish me to give them away, and publicly, too, is more than I can understand. I admit this is showing poor appreciation of your cordiality in electing me an honorary member of your society—to decline to return the compliment by giving you inside information—but I feel that you will excuse me if in my embarrassment I delay, until next year at least, any violation of the confidential relations into which Dr. Low seeks to break. If it is ultimately shown that sulfocyanate is useless from the therapeutic standpoint, Dr. Low need not be surprised to learn, on judgment-day, that the situation changed suddenly as a result of his indiscretion of today in seeking to beguile me into making the revelation he has solicited.

I hope Dr. Low will stick to his purpose to follow the line of my criticism last year, that is, to study as many cases as possible and report the results respecting all, instead of a few selected ones.

Dr. Low is surely correct in assuming that the laity can tell whether or not they are spitting shoestrings, but let us be sure that Dr. Low is stringing neither himself nor us.

I have made no experiments on the influence of sulfocyanate upon the oral bacteria since those reported by us three years ago. That first study very definitely indicated that sulfocyanate, in the proportions of its occurrence in saliva, did not modify the oral bacteria either structurally, nutritionally, or functionally. I believe that Dr. Waugh is wrong in considering this field a dental rather than a bacterio-chemical one. I am satisfied our findings were entirely reliable. Last year we indicated that yeast grows very well in glucose solutions containing very large proportions of sulfocyanate.

Before we draw any conclusions about the influence of the administration of iron on the amount of sulfocyanate in saliva, we should be sure that a definite effect of the iron has been established. It does not appear from the discussion that the diminution alluded to has resulted from the action of iron itself. Have other soluble salts of iron been tested in this connection—salts that are not acid? If, however, the administration of iron reduces the proportion of sulfocyanate in the saliva, let me suggest that the reduction may be due to events in the liver that involve the formation there of ferric sulfocyanate and its elimination in the bile, with corresponding reduction in the proportion of alkali sulfocyanate available in the blood for excretion through the salivary glands. I shall endeavor experimentally to determine the facts in this connection.

In Dr. McCoy's case the phenomena he discusses may be explained as direct results of the anemia, rather than the medication he mentions.

There can be no question that ferric

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chlorid solutions, with their comparatively large proportions of hydrochloric acid, are directly injurious to the teeth because of the action of the contained mineral acid. I have been studying for some time the effects of "food-acid" media on teeth. It is evident that such organic acid materials as fruit and vegetable juices are not only harmless in the quantities ordinarily eaten, but also may be used to advantage as dentifrices, since they (1) disintegrate and dislodge mucous films and deposits on the teeth, tongue, and oral surfaces in general, (2) tend to destroy or injure oral bacteria, and (3) stimulate salivary after-flow. Such food-acid media are *weakly* acid, *i.e.* the proportion of hydrogen ions due to hydrolytic dissociation is very small, and consequently the degree of resultant decalcification is negligible. On the other hand, hydrochloric acid is a *strong* acid, *i.e.* the proportion of hydrogen ions in its solutions is very large, and, accordingly, even very dilute solutions are strongly decalcifying in their effects. The oral fluids appear to fortify the teeth against the decalcifying tendency of the former—food-acid media—but do not seem to do so effectively against the decalcifying power of solutions of mineral acid.*

In discussing sulfocyanate as a preventive of caries, do not overlook the significance of the facts involved in the time-honored expression, "Clean as a hound's tooth." Dog saliva is free from sulfocyanate and even when a dog subsists for years on a diet containing much carbohydrate, its teeth remain clean and free from caries. How can this be explained on the basis of the sulfocyanate prevention theory?

* This matter has been more fully considered since the above discussion took place. See Lothrop and Gies: *Journal of the Allied Dental Societies*, 1913, vol. viii, p. 283.

W. J. G.

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The Pathologic and Therapeutic Possibilities of Upper Maxillary Contraction and Expansion

AS

Evidenced by Experiments upon Guinea-pigs, Rabbits, and Dogs, in Confirmation of Clinical Observations in Human Cases.

By GEO. V. I. BROWN, D.D.S., M.D., Milwaukee, Wis.

THE trend of modern progress in the study of disease is unquestionably toward recognition of underlying chemico-vital principles which may be held accountable for trophic changes and other influences pertaining to a general as well as local developmental progress and the nervous disorders to which these as well as other physiologic and pathologic conditions may be subject. The dissociated consideration of clinical and pathologic manifestations has undoubtedly led to the designation of many affections under distinct terms which, it is not at all impossible, may in the near future be understood to be expressions of the same underlying etiologic factors, and therefore in a primary sense more or less identical in character.

PURPOSE OF THE CLINICAL ILLUSTRATIONS.

The illustrations of clinical and experimental results that are presented for your consideration today cover a wide range of affections. They are designed to emphasize the possibility of a very much more extended association between defective nasal and maxillary development, with their consequent pathologic states and influences, and general development, trophic changes, nervous disorders, as well as other more or less remote affections, than is commonly recognized in this relation. Certain features of the etiologic, pathologic, and structural considerations which bear upon the influence of these oro-nasal factors in disease are well understood. Other causal factors, though recognized as important to pathologic manifestations in other regions, are not generally accepted as being of nasal and maxillary origin. A third division must, for the present at least, depend to some extent upon the more or less theoretic application of certain developmental features connection with which, in the absence of definite knowledge, can only be estab-

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lished by comparative consideration of certain vital phenomena which, viewed in the light of experimental results, clinical manifestations, and the more or less arbitrary application of better understood laws governing bodily growth and metabolism, appear to share at least a measure of interdependence.

DUCTLESS GLAND SERIES.

The close connection of the ductless gland series—which includes the hypophysis and the thymus and thyroid glands—with bodily growth and its antithesis, arrest of development, and also with nervous states and organic function, has forced recognition through an abundance of clinical evidence which is now being more and more corroborated, and at the same time systematized, in the course of scientific research, and particularly animal experimentation. The most valuable record of achievements in this direction has recently been presented by Dr. Harvey Cushing in his work, "The Pituitary Body and Its Disorders." He records certain syndromes as appearing when the anterior lobe of the hypophysis in dogs was severed or disjoined, and certain other quite distinctive syndromes as resulting from similar treatment of the posterior portion of this body.

CUSHING'S CLASSIFICATION—PITUITARY DISORDERS.

Following the classification previously adopted in the case of the thyroid gland, Cushing has applied the terms hyperpituitarism as indicating a state of overactivity, and hypopituitarism as describing states of under-activity of the pituitary, and since these two terms were found to be clinically misleading because of conditions which presented a blending of the symptoms of each of these forms of functional disorder, the term dyspituitarism became necessary to describe the states due to perverted function of the hypophysis.

He also suggests the following subdivisions for each of the five clinical groups under which he has classified the states of dyspituitarism: "(1) The cases in which the clinical manifestations of past or of existing hyperpituitarism predominate (more particularly overgrowth, resulting in gigantism when the process antedates ossification of the epiphyses, and in acromegaly when it is of later occurrence). (2) Those in which the clinical manifestations of hypopituitarism predominate (adiposity, with a persistence of both skeletal and sexual infantilism when the process originates in childhood, or adiposity with sexual infantilism of the reversive form when it originates in the adult). (3) The mixed or transition cases, exhibiting some features of both states—in other words, with evident dyspituitarism."

He further states that there may be combinations of inactivity of the posterior lobe with overactivity of the anterior lobe; a combination of overactivity of the posterior lobe with anterior lobe deficiency; and finally, a combination showing either overactivity of both lobes or deficiency of both lobes. All these possible states may occur either before or after adolescence, and lead to very different clinical pictures.

ANDERSON'S EXPERIMENTS.

Without attempting detailed description of the present scientific status of this question, it appears to be sufficient for us

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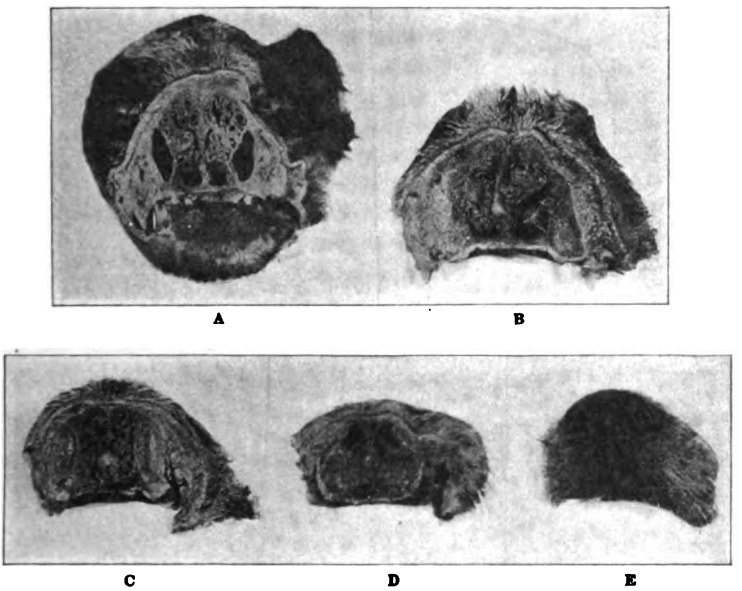
to call to mind briefly the potent possibilities of influences from this region, while we contemplate in this light certain well-known and commonly accepted facts pertaining to bodily disorders, and apply these as directly as possible in accounting for oral defects. The results reported by the late Dr. Anderson of Detroit, who closed the nasal openings of guinea-pigs, rabbits, and dogs with cotton by suturing the external nares, were much the same as those shown by the puppies in which I caused partial nasal stenosis to occur in a quite natural way by preventing growth across the maxilla in the region of the palate, as shown by the illustrations.

All these animals developed certain symptoms which were not unlike those commonly found among children whose contracted upper dental arches and high narrow palatal vaults are familiar to all.

Anderson's summary of the results of his experiments is as follows:

(1) Nasal obstruction leads to death or to serious impairment of vitality.

FIG. 1.



Sections of head of puppy six months old, with jaws arrested in development across the palate by wiring at eight weeks old. These sections when compared with those of a normal pup shown in Fig. 2 show plainly the contracted effect upon the nares, the deviation of the nasal septum—especially the section shown in C, the point at which the wire was inserted and development arrested. The enlarged maxillary sinuses are also evident in comparison.

(2) The lowered resistance predisposes to infections (particularly bronchopneumonia, sero-purulent pleurisy, and similar affections).

(3) Local disease of the respiratory tract is induced.

(4) Obstruction of the nostrils leads to dilatation of the heart.

(5) Changes in the skin and the blood of the dogs occur.

(6) Symptoms resembling asthma and

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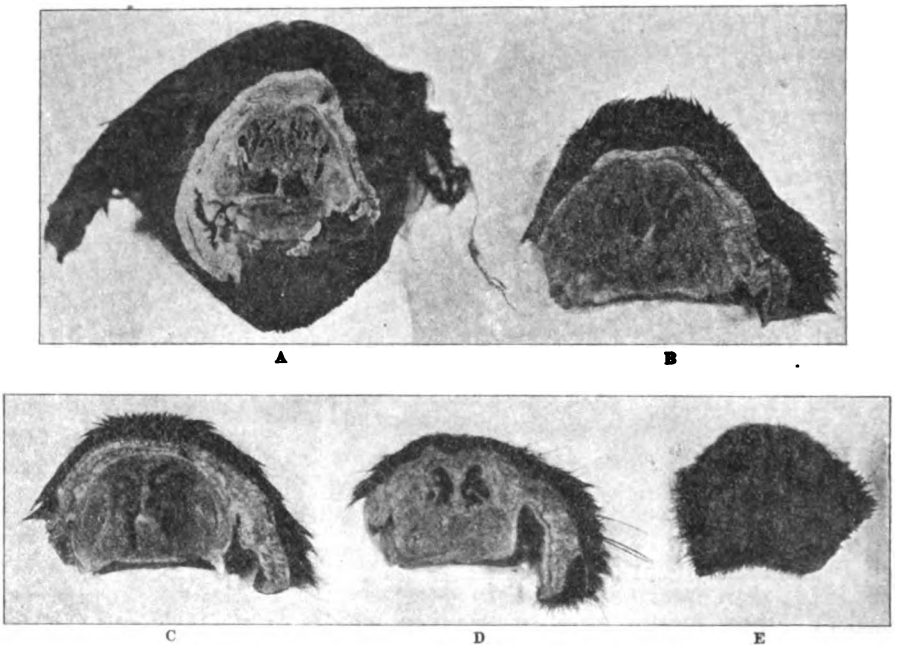
emphysema may be induced in the lower animals.

(7) Emphysema of the lungs can be demonstrated histologically.

(8) Reopening of the occluded nostrils is followed by prompt disappearance of the symptoms.

Several pups eight weeks old were operated upon by passing wires through the maxilla from a point above the roots of the teeth upon one side above the palate and out at a corresponding point upon the opposite side. The palate was compressed sufficiently to force the upper teeth inside or in lingual occlusion with the lowers, so that the upper and lower jaws of these puppies were placed

FIG. 2.



Control pup, same age as Fig. 1, upon which no operation was performed.

DESCRIPTION OF MY EXPERIMENTS UPON DOGS, AND THE RESULTS.

Through the courtesy of the Parke-Davis Company, in whose biological and research department I have been permitted to do original research work on puppies, and with the able assistance of Dr. Ferry and his associates in the laboratory, a series of experiments has been carried on during the past two years. The first of these I have previously reported as follows:

in about the same occlusal relation that exists with growing children whose bicuspid teeth meet the corresponding lower teeth in lingual (inside) instead of buccal (outside), or normal, occlusion. Not nearly so much force in compression was used as would be necessary to close a palate fissure according to the method which was formerly widely practiced upon infants with cleft palate. The purpose was to reproduce as nearly as possible the maxillary conditions of typical cases of mouth-breathing children. One pup was kept without operation as a control, and all were allowed to develop until they reached the age of six months, which it was estimated would approximately correspond to the age of a child of eight or nine years old. The

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puppies were then killed, the heads frozen, and sections cut through the nose and upper jaws at short intervals. The result is shown in Fig. 1, A, B, C, D, E, and Fig. 2, A, B, C, D, E. Marked difference between the nares will be noted throughout both series, but the section marked C in each is exactly at the point where compression was made, the almost complete stenosis in Fig. 1 contrasting quite strongly with the same section in Fig. 2.

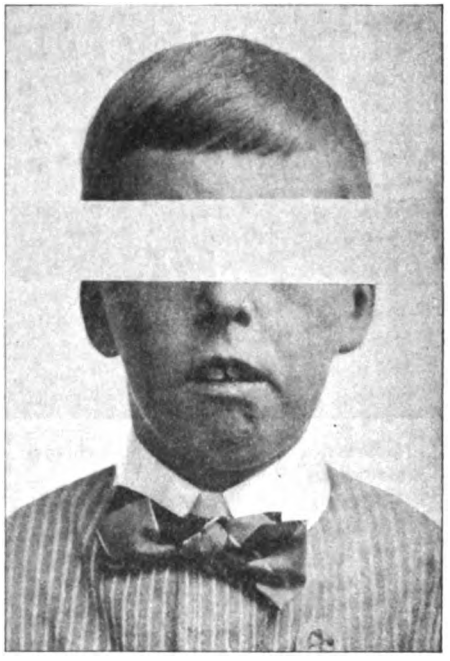
SYMPTOMS SHOWN BY PUPS SIMILAR TO THOSE OF HUMAN PATIENTS.

These pups developed the following symptoms, which are identical with those commonly found in children with high, contracted palates and irregular upper dental arches, viz, a high degree of susceptibility to infection, which was evidenced by congested bronchi and lungs, and was in marked contrast to the usually notable resistance to pathogenic bacteria of the bronchial mucous membrane in healthy dogs, and quite in accord with frequent colds, bronchitis, and tendency to pneumonic affections that are characteristic of all mouth-breathing children.

Extreme nervousness was also similar to children's of this type. The nasal accessory sinuses became enlarged. This is particularly evident in the maxillary sinuses as shown in Fig. 1, A. The experiment pups became emaciated and were not nearly so large and fat as the control pup, although given the same food. Making all due allowance for impure breed, there was still evident a considerable interference with trophic changes.

In view of the fact that children appear to lose these tendencies when relief is given by direct maxillary expansion, and since mechanical compression in the maxillary region alone was accountable for them in the dogs, there is at least a warrantable reason for the belief that, although these experiments are incomplete and still in progress, they already point in the direction of some great underlying principle which if understood would be far-reaching in its effect upon nervous and other diseases of general as well as local character. It

FIG. 3.



Face of boy nine years old. Typical case of mouth-breathing, contracted dental arches, etc.

is well known that the regions of the face, nose, mouth, and jaws give frequent evidence of the so-called stigmata of degeneracy. Neurotic tendency is commonly associated with contracted palates, irregular dental arches, and nasal defects.

THE INDICATIONS OF A DISTINCTIVE GOVERNING DEVELOPMENTAL INFLUENCE.

It seems to be of more than passing importance to note that among the early

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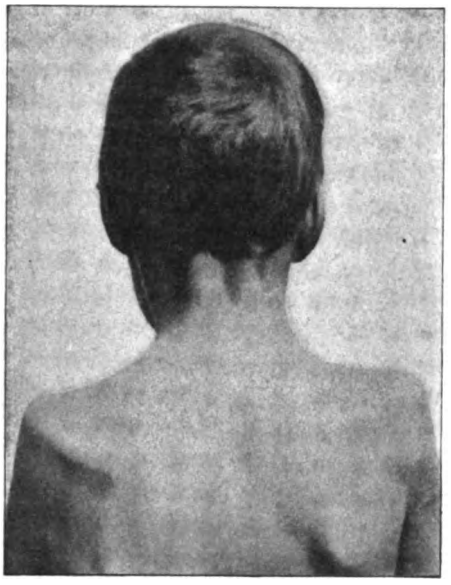
evidences of acromegaly the notable features are prognathism of the jaw, enlargement in the region of the shoulders, and of the extremities; that certain infections are also particularly evidenced in the extremities, as in the spade-shaped finger-tips of tuberculosis, and more or less similar effects from pneumonia;

FIG. 4.



Characteristically uneven shoulderblades of same boy as in Fig. 3.

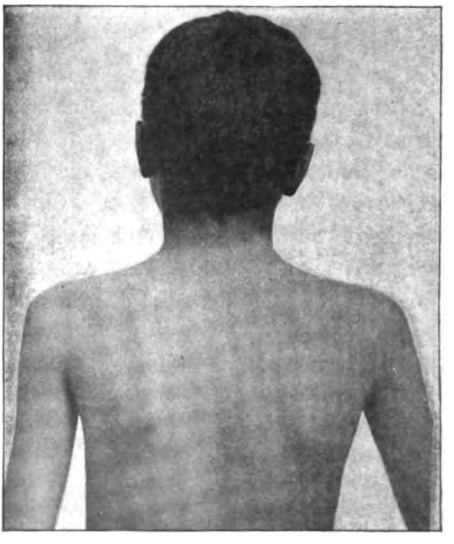
FIG. 5.

Enlarged thumbs and palmar wasting in hands of boy shown in Fig. 3.

FIG. 6.

Feet of boy shown in Fig. 3.

FIG. 7.



Characteristically uneven shoulderblades.

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alterations in form which appear in the course of rheumatic affections; the characteristic enlargement of the face and neck in angeio-neurotic edema, or the wasting of facial hemiatrophy—and so on through a large number of affections that might be cited if necessary, to prove that certain local as well as general atrophic and hypertrophic conditions occur not only during the pre-adolescent period of development, but at all periods of life—conditions such as can only be satisfactorily accounted for by the recognition of some distinctive governing influence the stimulation or impairment of which must be held to account as causative.

Among patients referred to me by rhinologists for maxillary expansion to correct pathological states coincident with contracted nares and deflected nasal septa who had also high, narrow palatal vaults, irregular dental arches, adenoids, enlarged tonsils, and typical mouth-breathing, I have found upon more general examination that in a large number of cases their backs were also irregularly formed, one shoulderblade being larger than the other, and one of them higher or lower with a tendency to curvature of the spinal column. (Figs. 4–7.) The hands and feet also quite frequently showed irregularities. In the hand, palmar wasting and an enlarged thumb were sometimes conspicuously evident. (Figs. 5 and 6.) One side of the face was sometimes found to be more developed than the other, the unilateral asymmetry being quite outside of that which might be expected from irregular teeth alone. These features bore a striking resemblance to the recognized indications of muscular dystrophy, which in its progressive form leads to weakness and actual loss of usefulness in muscles of the affected regions, and which may end in death, or in some mysterious way become arrested, leaving the muscles in a state of partial usefulness. In the comparatively crude state of present knowledge with regard to these conditions, these cases have been classified in a limited way, and named after their first observers, as follows:

FORMS OF MUSCULAR DYSTROPHY.

The Duchenne type—pseudo-hypertrophy and apparent disproportionate increase in the size of the muscles, usually beginning with the calves of the legs, which is really an increase of fat cells with atrophy of muscular fibers.

The Erb type of juvenile dystrophy, usually beginning between the ages of twelve and sixteen, affecting primarily the muscles of the shoulder, which become hypertrophied but weakened, and by gradual progress affecting the muscles of the body.

Landouzy-Déjérine dystrophy is also usually developed in early childhood, but occasionally appears in adults. Its principal feature is muscular atrophy of the face, which begins with the orbicularis oris, extends to the risorii, to the levator menti, and to the other muscles of the face associated with the mouth. In consequence, the lips cannot be firmly closed, the mouth is habitually open with the lips projecting, the so-called "tapir mouth;" quite naturally there is more or less difficulty in speech, in control of saliva, in drinking, and in other acts which depend upon the lips. There are no fibrillary twitchings, no disturbance of sensibility, and there is gradual decrease of mechanical muscular excitability.

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Certainly it is more than a coincidence that the parts chiefly affected by the several forms of muscular dystrophy are so nearly identical with those that we find are not uncommonly irregular among patients whose chiefly noticeable defects are in the region of the nose and mouth. The patients shown in the illustrations not only showed an improvement in general health when their palatal arches were expanded by direct pressure which caused a separation of the upper maxillæ at the median palatine suture, giving increased space for nasal breathing and a consequent healthfulness of intranasal tissues, but also freedom from disadvantageous nervous states. There was, moreover, an apparently complete arrest of irregular development in other regions of the body. It would be assuming too much in the light of our present limited knowledge of such conditions to say positively that these were real cases of muscular dystrophy, which would otherwise have produced complete helplessness or death, and that maxillary separation alone was responsible for the correction of the defective developmental tendency; but there can be no doubt about the fact that these individuals did not become worse, and that they did improve in general as well as local development. In one case the cousin of one of these patients already bears a shriveled leg upon one side which cannot reach the ground and is incapable of serving any really useful purpose, and the members of the family at least believe that his symptoms began in much the same way as those of the little fellow for whom I performed maxillary expansion, and who is now sturdy, evenly growing, well developed, and in all respects a progressive youth.

THE INFLUENTIAL FACTORS IN MAXILLARY EXPANSION.

The observation and treatment of large numbers of cases of this class has made it possible to outline certain conditions and results that may be so fully demonstrated as to warrant their definite acceptance. Other conclusions, as already indicated, must for the time being only be considered as important possibilities, and yet the known facts point the way so plainly along this line of scientific reasoning, and the wonderful benefits that seem to lie just before the orthodontists and dentists in this promised increase of their usefulness are so great that their due consideration is imperative. We do know that following maxillary separation by rapid expansion in individuals presenting the clinical picture I have described, there is manifested in addition to the relief of freer nasal respiration and better nasal accessory sinus drainage, an influence upon nerve tension that tends to bring about a general improvement in nervous conditions. This is many times an active factor in helping to overcome a tendency to habits such as winking of the eyelids or similar involuntary acts that simulate the beginning of spasmodic affections. An almost innumerable list of other evidences of unstable nervous tendencies could be described if necessary. Notable examples of these are referred to in connection with the illustrations. The dulness and apathy which are not only pathognomonic of mouth-breathers, but of serious nervous states as well, seem to disappear. These patients do better in their school or college work after this treatment than before. Increased growth or weight indicates that the centers governing trophic

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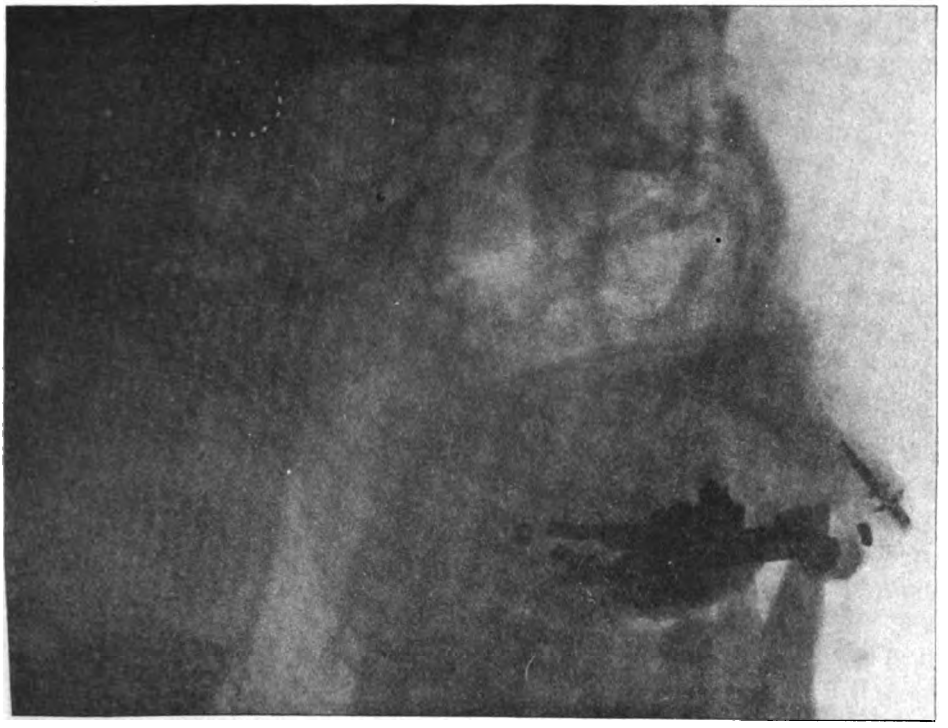
changes have been stimulated. How much of all this progressive effect the improved respiration, unaided by any other factor, may be responsible for, it is difficult to say, but it is reasonable to assume that the vital and final influence to the large foramina, through which the cranial nerves and accompanying vessels must emerge, and compression of which under disturbed conditions might be favored by imperfect development.

If the direct mechanical influence of

FIG. 8.



Skiagram of the head of one of these patients, showing the enormous size of the frontal sinus and the peculiarly restricted sella turcica, which is outlined with white dots. In this case there were not only peculiarities of growth of shoulderblades and other parts, but a correspondingly limited mentality. Just how much benefit maxillary expansion may ultimately accomplish for this patient of twenty-five years it is too early to attempt to decide, but a measure of relief has been given to his almost constant headaches, and other symptoms of frontal sinus disease seem to have abated or entirely disappeared. General trophic as well as nervous conditions seem to be improved.

lies much deeper. In a prophylactic sense there is almost unlimited opportunity for expansion in the region of the jaws and face to give greater developmental freedom at the base of the skull in young children, thereby favoring more perfect conditions pertaining the treatment does not materially affect the form of the sella turcica, a possibility that must be considered, then it is quite probable that the hypophysis may retain, even in advanced age, a susceptibility which tends toward a return to the closer association with

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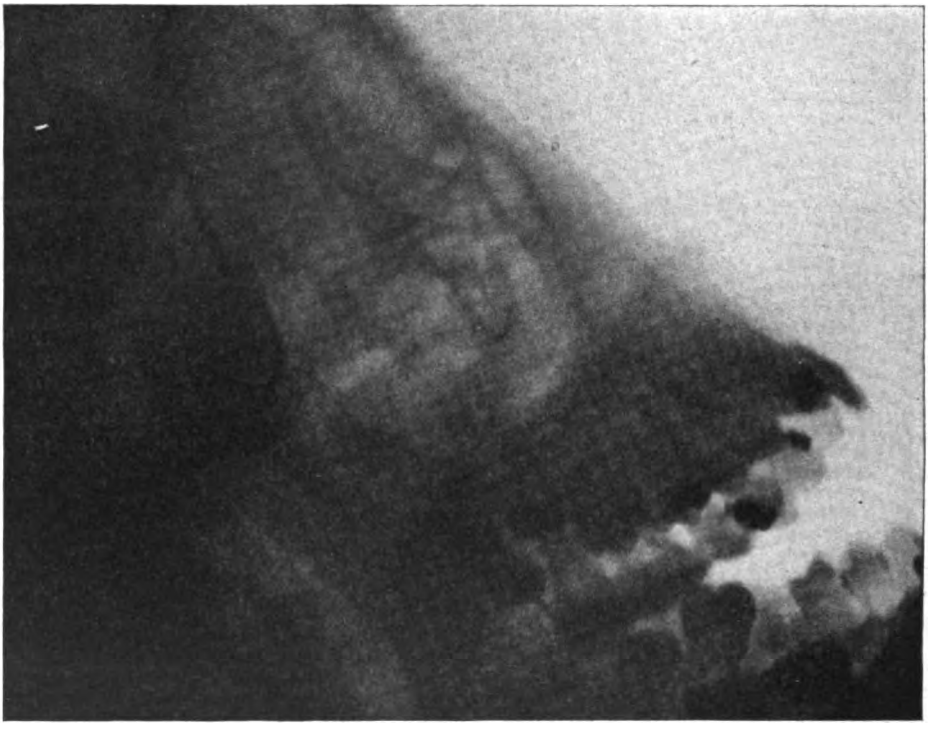
respiratory conditions that it appears to have in early life, and thus be stimulated to unusual or at least restored activity by the change in the respiratory apparatus which has been accomplished; or the result may be attributed to some extent to the pharyngeal hypophysis—a small epithelial body situated in the pharyngeal mucosa, and which according to Cushing has been recognized by Erdheim and Cavallieri and was systematically studied by Haberfeld, who found this small glandular strand, varying from 1 to 7 mm. in length, situated in the mucous membrane just behind the alæ of the vomer, with regularity in a systematic study of fifty-one human subjects, and designated it the "hypophysis pharyngea." If it can be demonstrated that the pharyngeal hypophysis shares or can be made to substitute for the pituitary activities under either normal or abnormal conditions, then much which is now clinically demonstrable in cases of maxillary contraction and their subsequent expansion might be readily accounted for, because the parts adjacent to the alæ of the vomer would

FIG. 9.



Skiagram of the head of a boy with markedly deficient mentality. The use of numbers seems to be beyond his control. The irresponsible, more or less uncontrollable disposition which is peculiar to cases of this kind has made it difficult to determine results accurately, but there seems to have been a definite measure of benefit from spreading his upper arch that it was admitted no other agency could accomplish.

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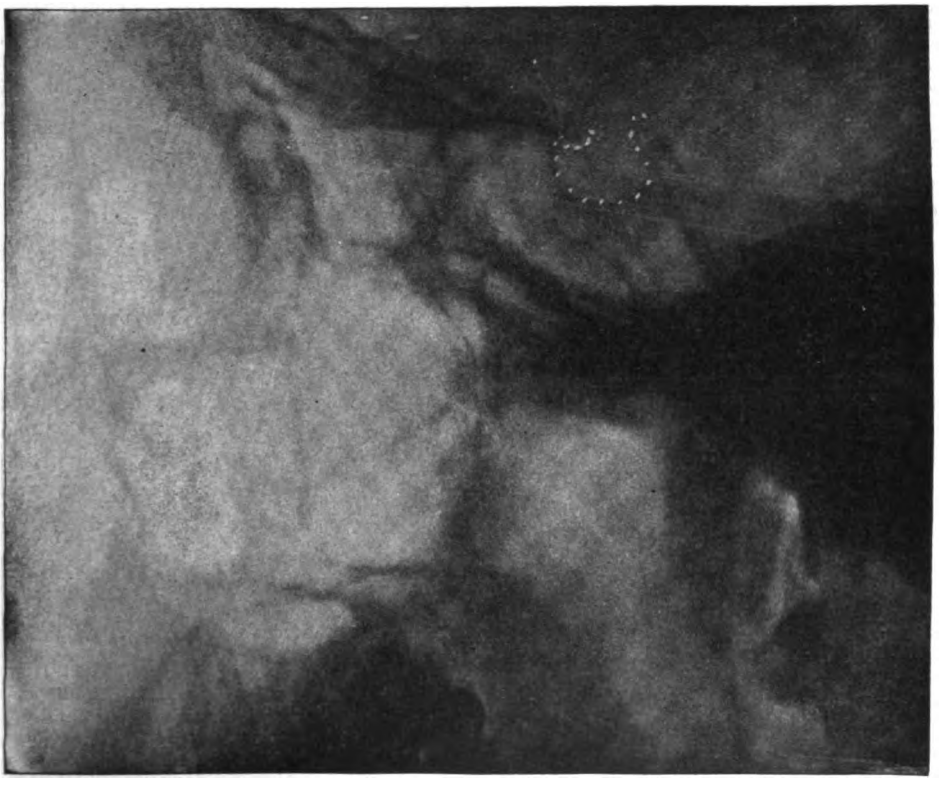
be the very first that one might expect to be affected by maxillary expansion effected through separation of the median palatine suture. The promptness with which trophic changes and the relief of nervous conditions sometimes occurs in the course of this treatment of these patients would then be more satisfactorily accounted for than by any result which might occur subsequent to changes in bone development, even if these could be demonstrated to ultimately alter the form of the sella turcica as previously suggested.

CLINICAL EXAMPLES.

The examples shown in Figs. 8–21 appear to be dental and facial irregularities of development of a not uncommon type, while yet further study of their histories and symptoms reveals the fact that they are closely akin to recognized forms of muscular dystrophy. The results of treatment are apparent

FIG. 10.



Skiagram of the head of a man thirty years old. Shows the same large frontal sinus as Figs. 8 and 9, and a large sella turcica, the individual himself being a man of large size. In his case a grave and almost hopeless general nervous condition was apparently overcome and a complete cure effected, with no other treatment than separation of his upper maxillæ and the incidental freer drainage of the nasal accessory sinuses, with consequently improved respiratory conditions, and regular outdoor exercise. No one of the individuals who watched this case throughout the course of treatment has the slightest doubt of the directly beneficial influence of spreading the upper maxillæ.

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in both general and local improvement. The following case is typical of many others that might be illustrated and described:

Case I. A girl, age sixteen.

History: Three operations had been previously performed for the removal of naso-pharyngeal adenoids, with aparent recurrence after each operation. On account of general ill health, nervousness, and frequent colds, attended by evidence of both local and general arrest of development, the patient had for some time been unable to attend school continuously, and suffered frequent illness.

Symptoms and general appearance: Height 5 feet 2 inches; weight 92½ pounds. More or less other indications of insufficient development. Marked inequality of development in the region of the shoulderblades, closely approximating if not identical with the Erb type of juvenile dystrophy. This was so evident, her mother said, that dressmakers had considerable difficulty in fitting her dresses. Marked nasal obstruction, arrested development of the lower part of the face, receding chin, and contracted upper and lower dental arches. Two upper bicuspids—one on each side—had been removed by some dentist, with the mistaken idea of correcting dental irregularity. When she was about nine years

FIG. 11.

Skiagram of the head of a young man twenty years old which shows an enlarged frontal sinus and a very large sella turcica. In this case there was evidence of a tendency to acromegaly noticeable in the very much enlarged lower jaw, which was prognathous, with the lower teeth extending three-eighths of an inch beyond the upper. He had also the characteristic broad fleshy nose and thick lips, chubby hands, and square-shaped finger-tips described by Cushing in cases of hypopituitarism. Extreme sensitiveness of his eyes threatened loss of vision, although examinations by oculists revealed no local condition to account for this affection. These, together with excessive nervousness, had obliged him to give up school. Almost immediately following spreading of the upper arch and wide separation of the central incisors, which indicated maxillary separation, his nervousness and the eye condition began to improve. In a short time he was able to continue and has since finished his college course. He is now in business and apparently unaffected by his previous trouble.

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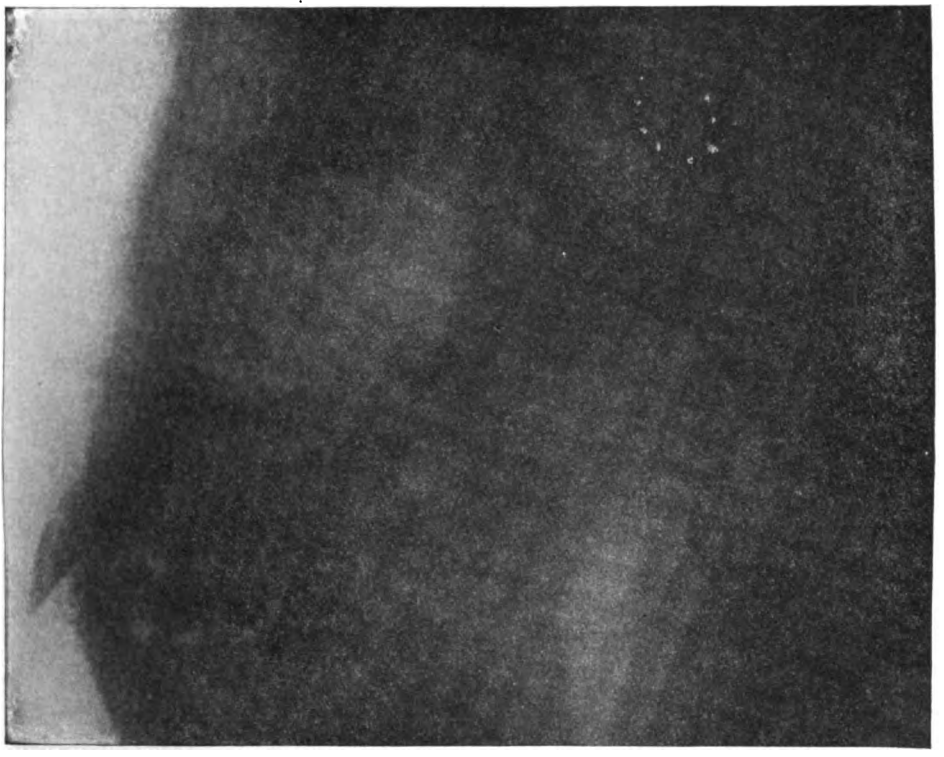
old the spaces thus caused were almost completely closed by contraction of the upper dental arch. One lower bicuspid on the right side had been extracted about the same time with the same effect.

Treatment: The upper maxilla was readjusted by maxillary expansion, and the lower arch made to correspond. Both arches were

FIG. 12.



Skiagram showing the opposite type of development. Instead of being short and broad as was the case with the patient represented in Fig. 11, this girl of eleven years was tall, thin, ill-nourished, and so nervous as to be almost a chronic invalid. Marked improvement followed separation of the upper maxillæ and the establishment of freer nasal respiration.

increased in an antero-posterior direction sufficiently to regain as far as possible the space lost through extraction of the teeth, after which a dentist, Dr. P. B. Wright of Milwaukee, inserted bridge work to retain the full size of the jaws thus secured.

Result: Increase in health and weight. Relief from excessive nervousness. Improvement in back and shoulders. She finished her high-school course and is now successfully employed in hospital work.

REASONS FOR BELIEF IN MEDIAN MAXILLARY SUTURE SEPARATION.

After approximately fifteen years' continuous experience in widening dental arches by rapid expansion for the purpose of enlarging the nares through separation of the median palatine suture, or, as I have previously called it, "readjustment of the maxillary bones," with almost invariably satisfactory results in giving at least a measure of intranasal relief, it is with surprise that I note a more or less marked tendency among orthodontists to question the practicabil-

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ity of this simple process; the more so because the idea is not new. Undoubtedly most of those who regulated teeth according to older and perhaps somewhat cruder methods have occasionally been more or less alarmed by the unexpected parting of the central incisors

Separation of the superior maxillæ at the symphysis. When strong pressure is applied upon molars and bicuspids to spread the arch the superior maxillæ may be separated at the symphysis. Such separation was first recorded by Dr. E. C. Angell of San Francisco in 1885, and has been noticed by Guilford, Black, Talbot, Farrar, Ottolengui, and others since.

FIG. 13.

Skiagram of the head of a young man seventeen years old. (The headaches and other symptoms in this case were markedly improved as soon as the separation of the maxillæ was accomplished as shown in Fig. 14.)

through separation of the maxillary bones. Usually references that have been made to this condition formerly were along the line of caution against its occurrence.

Dr. Clark L. Goddard, in Kirk's "American Text-book of Operative Dentistry" (2d edit., 1900, page 698), makes the following reference:

Bogue and other operators with whom I have discussed the subject described having had similar experiences. Dr. F. M. Willis, of Utica, N. Y., in the *Dental Cosmos* (July 1911, pp. 784–86) gives a very clear description of some cases in which successful results were obtained through separation of the maxillary bones for patients of Dr. J. S.

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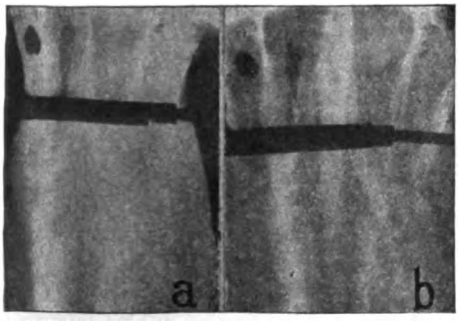
Kirkendall of Utica, and Dr. Varney of Cleveland, Ohio, has also contributed much evidence in this direction.

In my own early practice I have sometimes been quite seriously alarmed by having caused it inadvertently. The first case in which I performed this operation for the specific purpose of immediately increasing the width of the nares in a case of almost total deafness,

FIG. 14.



A B

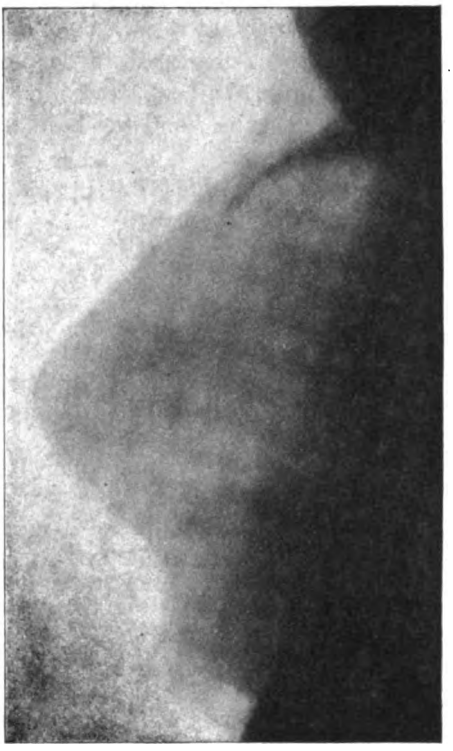
Skiagram of the palate of the same young man as shown in Fig. 13. A, Showing the appliance in place, but before pressure has been applied. B, Showing separation of the median palatine suture.

in order that Dr. Nelson M. Black of Milwaukee might be able to catheterize the Eustachian tubes to relieve the oral conditions, has been widely reported, as have many cases since treated in association with rhinologists in widely different parts of this country. In fact, so many such results have been published or otherwise recently reported that only a passing notice is practicable at this time.

In support of my own belief I offer the following summarized evidence in proof that it is at least well founded:

(1) Large numbers of cases in which within a period of approximately seven days to two weeks the central incisors have moved apart without the direct application of any force whatever to these teeth, and in which according to the reports after examination by rhinologists

FIG. 15.



Another skiagram of the same case as Figs. 13 and 14, showing that in addition to the usual indications of separation of the median palatine suture there was a slight separation between the nasal bones and nasal process of the superior maxillary.

there was corresponding improvement in the intranasal conditions, with evidence of increase in the size of the nasal chambers. Among these were many cases of recognized disease of the nasal accessory sinuses which gave evidence of such prompt improvement through better drainage that the shortness of time

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alone would seem to preclude the possibility of this benefit being brought about in a more indirect manner.

(2) I have demonstrated by the use of a green skull that force applied across the palate can be made to separate the median palatine suture through its entire length, and also the intra-maxillary suture, and that the width of the nares can thus be increased. The pictures of a green skull so treated have been widely published, and the head itself with the suture separated, and the appliance in place was exhibited at the meeting of the American Medical Association in Chicago in connection with a paper read before the Section of Stomatology of that association. Moreover, the actual separation was accomplished in the presence of reliable witnesses. This statement appears to be called for because I have been given to understand that others have not been successful in accomplishing a like result. Personally I do not consider this a very accurate test; there are many conditions pertaining to the character of the specimen, the nature and direction of the force applied, as well as other questions, that may tend to alter the results in this kind of demonstration. It did, however, prove that when separation does take place along the line of this suture, as a result of force applied across the palate, it is complete, and the nasal chambers are correspondingly widened.

FIG. 16.

Skiagram of the palate after the maxillæ were separated in the mouth of a boy thirteen years old.

FIG. 17.

Shows that there was a marked separation between the nasal process of the superior maxillary and the nasal bone. In this case the change in the nose was evident to the naked eye and could be noted by digital examination also. The same condition has been noted in many cases of young patients when a wide separation has been required to correct nasal and maxillary conditions

(3) I have had one case of fracture due to an accident with a motor-cycle the jar of which forced the lower jaw against the upper in such a manner as to force the maxillæ apart. In this case the maxillary bones were so widely separated that the overlying muco-perios-

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teum was torn apart. The primary object in sending for me was to have the palate fissure closed. This, however, was unnecessary as soon as the bones were pressed together again. I have also been called into consultation in one other similar case in which there was separation of the median palatine suture as a result of an automobile accident. In both these cases there was fracture or dislocation of other facial bones which appeared to have been occasioned by the forcing apart of the upper maxillæ as a result of the traumatism. Each appeared to establish the fact that the force accidently applied immediately parted this suture, just as occurs more moderately when an appliance is used for the purpose.

(4) In one of my patients, a little girl of about eight or nine years, the forcible straightening of the nasal septum by the injudicious use of a nasal splint brought it down through the median palatine suture until its lower border could be felt upon the palate surface.

(5) Not infrequently there is a marked depression, sufficient at least to indicate the absence of bone tissue, that may be noted by external examination above the central incisors when they have moved apart in the course of maxillary separation as described, and occasionally in the central portion of the palate the change in the central suture may be recognized by digital examination. Occasionally the line along this division may also be observed in an impression of the mouth taken immediately after the removal of the appliance when for any reason a wide separation of the maxillary bones has been found necessary.

(6) The patients themselves almost invariably recognize the difference in nasal breathing, and this improvement occurs when other evidences indicate

FIG. 18.

Skiagram of the mouth of a young man eighteen years old, taken exactly twenty days after the separating appliance was applied. In this case there was a marked perverted tendency as reported by his father, and a distinct improvement in his ability to study, which was shown as he continued his university course.

FIG. 19.

Skiagram of the mouth of a young man eighteen years old referred from the University of Wisconsin because he failed to keep up with his work during the first semester. After expansion he was enabled to continue attendance and make satisfactory progress. Increase in growth during the succeeding year was noticeable. He also had good health and a freedom from colds and bronchial trouble such as he had never previously enjoyed.

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that the nose has been widened and the volume of air correspondingly increased at each inhalation. The degree of the change is naturally governed by the condition of the nasal mucous membrane, which may be rapid or slow or variable in its response.

FIG. 20.

A B

Skiagrams of the mouth of a girl eight years old. A, Showing appliance in place but before pressure has been applied—taken June 29, 1913. B, The same mouth July 29, 1913. This result might have been secured much earlier except for delays which occurred by the patient's being out of the city.

FIG. 21.

Skiagram of the mouth of a boy twelve years old who was a chronic sufferer from hay-fever, headaches, bronchitis, and general nervous conditions, particularly noticeable in winking of the eyelids. Marked improvement in all these symptoms followed widening of his upper dental arch in July 1912. The skiagram of his palate was taken January 11, 1913. The thick black line along the line of the median palatine suture seems to indicate new bone formation in that region. During these six months his growth in height was increased two and three-quarter inches.

FIG. 22.

Skiagram of the palate of a young man twenty-eight years old for whom wide separation of the median palatine suture was performed, with great benefit to nasal and general pathologic conditions; taken two years afterward. The thick dark line shown where new bone had formed in the line of the formerly separated median palatine suture, proves that the osteogenetic layer of the palatal periosteum does become active under these conditions and that new bone formation results.

(7) Patients also commonly report feeling the effect of pressure high up in the nasal and maxillary regions when the nut is turned tightly after the maxillæ have been separated.

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(8) Rhinologists' examinations almost invariably disclose that there has been an immediate enlargement of the breathing-space. Practically all such patients in my practice are referred to rhinologists for examination as soon as the incisors are moved apart sufficiently to warrant the belief that there has been a noticeable change within the nose.

(9) The X-ray invariably gives pictures such as Figs. 14–20.

(10) Fig. 22 shows the radiograph of the central portion of the palate of a man twenty-eight years of age whose upper maxillæ were widely separated because of marked intranasal deformity and nasal disease associated with pathologic conditions of the nasal accessory sinuses and a debilitated general state which precluded physical effort. All these symptoms have since almost entirely disappeared. This radiograph, taken two years after his mouth was expanded, shows a dark, broad line which seems to indicate that bone has been developed along the line of the interspace between the bones separated through the median maxillary suture, just as one would be led to expect would occur under any other similar condition.

DISCUSSION.

Dr. A. W. Cutler, Oneonta, N. Y. Dr. Brown has so completely covered the subject that little remains for the practitioner of general surgery to say. There are a few points, however, that I would like to speak about. The sentence that attracted my attention particularly is that in which he impressed upon the members of the dental profession the importance of early recognition of what may prove something more than a deformity of the jaw, for such a deformity is often the initial symptom of graver disturbances which, if recognized in their early stages, may be led to complete recovery, while, if allowed to remain unchecked, it may possibly mean that a boy or girl will be nothing more than an imbecile.

Vesalius, in 1553, began the argument about the pituitary body which has been carried on up to the present time, and I am glad to say that we know a little more than was known in the fifteenth century, though not much. If we stop to consider, we recognize the fact that there is some governor somewhere in the economy, probably something of the nature of the ductless glands, which has much to do with the functions and development of the body. Just how much the pituitary body contributes its share to this, I regret I am not in position to tell. We do know, however, that a high palatal arch pushing the bones of the face and the base of the skull upward, and making the drainage of the accessory sinuses of the nose difficult, usually produces a condition of mentality that is poor. I think this observation has been made by all careful investigators. Whether the spreading of the palatal arch and facilitating the drainage of the accessory sinuses brings about this condition of improvement, or whether the removal of the block in the

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circulation allows the function in the pituitary body which may have been impaired to be resumed, is a question open for discussion. The pituitary body was discovered and the first study of it made in 1838 by Rathke, who traced its development from two different sources, finding that the pituitary body is a complex body, composed of ciliated tissue or glandular tissue, like the thyroid and thymus glands, in one portion, and consisting in the posterior portion, if I am not mistaken, of neurotic tissue, particularly. It would require too much time to stop to consider the anatomical construction of this gland and its possible functions. I will state, however, that from the point of view of the general surgeon, the drainage of the sinuses of the head and face and the removal of obstructions from the nasal cavities have been followed in almost every instance by increased mentality and better physical development of the individual. There is also a nervous element in the pituitary body, which may account for improvement in the circulation. In a case of chorea in a girl of fourteen years of age, upon the removal of the adenoids and tonsils—the blocking of the circulation—recovery ensued in an almost incredibly short time, without any other treatment of the patient's nervous condition.

Dr. F. L. STANTON, New York. In the last few years, our essayist has appeared before medical and dental societies, and has advocated this operation for the improvement of breathing. When Dr. Brown first advocated this treatment, he laid no stress on the necessity of establishing occlusion of the teeth as a part of the operation. I was glad to hear him say tonight that he does pay attention to this phase. I feel the evidence would have been more convincing if he had presented one or two cases in which he has completed enlargement of the nares and obtained occlusion of the teeth; for if there is one word that should stand out in any operation influencing the movement of teeth, it is the word *occlusion*. I repeat that his evidence would have been stronger if he had presented one single case showing the results from the viewpoint of normal occlusion. As Dr. Gies has said today, we should approach our scientific work in a critical attitude, and I believe before any dentist attempts the spreading of a child's arch in the manner advocated by the essayist, he should carefully go over the experiments of Dr. Brown as outlined in his papers. When I became interested in this work, I read the essayist's papers, in which he maintains that many times in the cadaver, by the application of a simple jackscrew, he has opened the median suture.

Dr. BROWN. Not so; I said that I regarded the skull proposition as very uncertain—that you could not tell much about the cadaver.

Dr. STANTON. As I read the articles, you said that many times you had performed this operation in the laboratory, and could easily open the median suture with the jackscrew.

Dr. BROWN. I never said anything of the kind.

Dr. STANTON. In order to verify the experiments of Dr. Brown on the cadaver, I obtained a green skull. To make the record of the experiment more complete, I took plaster impressions, and made an accurate model of the occlusion before I started. (See Fig. 1.) I then placed in position the appliance shown in Fig. 2, A, made after Dr. Brown's de-

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scription and illustration. I turned the jackscrew, No. 2, until it bent upon itself. I then reinforced the appliance with three S. S. White steel jackscrews (Fig. 2, Nos. 1, 3, and 4) and screwed and broke one of them and several instruments which I used in turning these jackscrews. I then made the jackscrew illustrated in Fig. 2, B, and turned this appliance until the bones began to break, and the Angle "D" bands which had been used for anchorage were torn from the teeth. I had previously dissected away the soft parts covering the palate, in order to see the suture when it would open. This it failed to do, as is shown in Fig. 3, which shows the condition at the end of the experiment. I then removed the appliance, and the teeth of

FIG. 1.

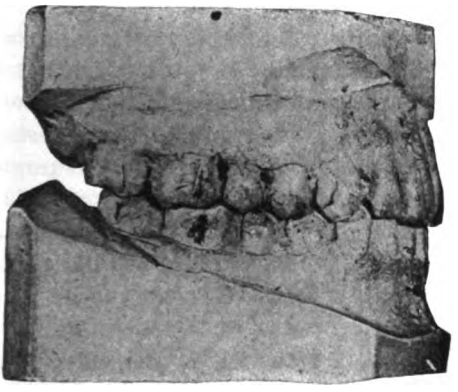
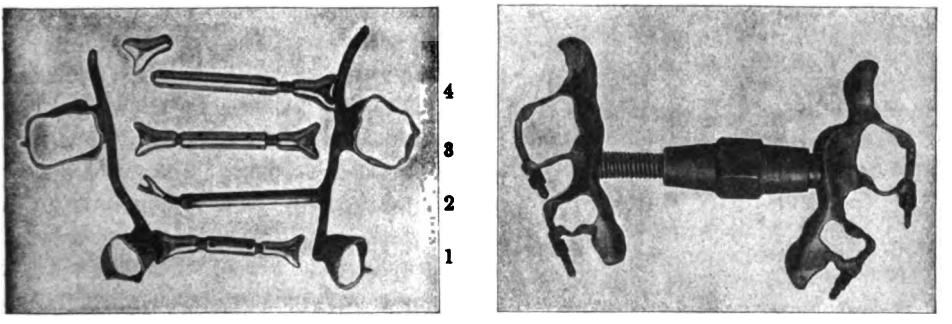


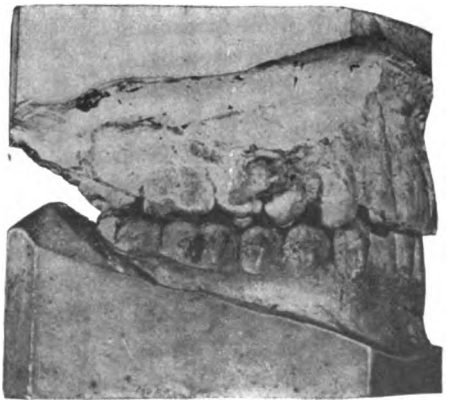
FIG. 2.



A B

FIG. 3.

FIG. 4.



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the upper jaw, which had been moved into complete buccal occlusion with the lower, sprang back toward their original places, as illustrated in Fig. 4. Fig. 5 illustrates the skull with the last appliance in place, showing that the upper arch has been spread entirely outside the lower.

I repeated Dr. Brown's experiment, and, having failed, I multiplied the

FIG. 5.

force he applied in opening the suture on the cadaver many times by the use of the appliance illustrated in Fig. 2, and offer the results as evidence, having carefully repeated his experiment and surrounded it with as much care and detail as would seem necessary in order that others may check up the results. The skull is preserved in the Cornell Medical School at New York, and the appliances I have at my office.

Dr. H. C. FERRIS, New York. What effect would be produced in the arches a year or a year and a half after this operation has been performed? Would the nasal cavity return to its normal size, if the teeth were not retained in position? We find in rapid expansion of arches that the more rapid the operation, the more rapidly the teeth return to their original position. The question of separating or opening the suture between the maxillæ is an open one. The majority of orthodontists are not satisfied with the evidence presented at the present time. I was very much interested in hearing the essayist's report, and am very anxious to see some of the cases in which this operation has been actually carried out.

Dr. R. H. HOFHEINZ, Rochester. Does the essayist use a special technique for spreading the arches, or does he use one that is known to us in general practice?

Dr. F. C. KEMPLE, New York. I would like to ask whether the essayist made radiographs of the cases that he showed on the screen previous to his operation, and compared them with radiographs that were made following the operation. What difference did he find in the radiographs made prior to and those made after the operation? As a matter of evidence, the radiograph is more or less disappointing at best, because of distortion of the shadow that necessarily goes with it, and the impossibility of getting exactly the same relation of tube, plate, and subject in two or three exposures. In most cases three or four different shadow conditions will be found in so many exposures.

This question of spreading the arch and its effect was discussed before the American Society of Orthodontists in Chicago last summer, and we were unfortunate in not having Dr. Brown pres-

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ent at that time. He was on the program to discuss one of the papers, but, because of some confusion in the dates, he was not able to come. At this time Dr. M. H. Cryer of Philadelphia presented a theory which appealed to me as the most plausible explanation of the restoration of normal breathing after spreading the upper dental arch or enlarging both upper and lower arches; his theory is that, by the constricted dental arches, the tongue is crowded back into the pharynx in such a way that it closes the air-passages and prevents any breathing. In order to breathe, the patient is forced to open his mouth and release the soft palate. When the dental arches are enlarged to normal the tongue is given opportunity to move forward into its normal position; the soft palate is released, and the patient can breathe through the nose.

During mouth-breathing, owing to lack of function, the membranes of the nasal tissues become engorged and somewhat hypertrophied, and the nasal passages more or less constricted. As soon as the tongue occupies its normal position in the arch and the patient begins to breathe through the nose, the restored function of these tissues re-establishes the normal condition of the nasal passages.

It has been questioned whether the enlargement of the nasal passage is simply a return to the normal condition of the nasal tissues, or whether it is an actual enlargement of the nasal passages. Whether the maxillary suture is separated or not is a matter of little importance; it is the beneficial effect obtained by the patient that is the important consideration.

Dr. H. S. DUNNING, New York. I would like to ask Dr. Brown what percentage of cases of acromegaly are improved by the expansion or opening of the suture, as he described it.

Dr. BROWN. I never meant that.

Dr. DUNNING. You spoke of the pressure at the sella turcica of the sphenoid bone, and of relieving that pressure by opening the suture. I cannot see how you relieve that pressure on the sella turcica of the sphenoid bone, or relieve pressure on the foramina at the base of the skull. You speak of the large vessels and nerves that pass through the foramina in the base of the skull, and how pressure might cause disturbance in this region. I can see how the nasal and the accessory nasal sinuses are enlarged and better drainage established, but I do not quite understand how, by opening the suture of the maxillary bones, pressure on the sella turcica or pressure on any part of the body of the sphenoid can be relieved.

Dr. OSCAR CARRABINE, New York. I have listened to the paper with much interest, and think we should do this work more slowly, and mark the occlusion more closely. How do we detect malformation of the bone? I believe that in the practice of orthodontia we are correcting malformation and malposition of the maxillary bones. We use the teeth simply as a guide. There is malformation or malposition of the maxillary bone before the first molars are erupted, and when they erupt either mesially or distally, we use the teeth as a guide to note the correct position of the maxillary bones. Since we are treating malposition of the bones, and the only real guide we have is normal occlusion of the teeth, I think it is more humane, and it seems to me more reasonable, to do this by orthodontic measures, and not so rapidly. By moving all

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the teeth, both upper and lower, gradually to their normal positions, we obtain the same results as by the method Dr. Brown has advocated. Orthodontists have noticed in many patients the same improved mentality that Dr. Brown has mentioned, and we obtain this result in a slower and, I believe, a better way. As I understand, Dr. Brown employs the jackscrew and produces pressure without consideration of the occlusion or position of the mandible or the lower teeth, and it would seem better for the health of the patient to use a slower method, taking into consideration the occlusion of the teeth.

Dr. BROWN (closing the discussion). With reference to Dr. Stanton's experiment, I can only say that I know perfectly well that what he undertakes he does sincerely and earnestly. I am satisfied that he did encounter the difficulties which he has described, but he made an error in saying that I have ever said this result was easy to accomplish upon a green skull, or that I had done it often.

We did separate the median palatine suture of a skull supplied by Dr. L. W. Dean of Iowa City, from the anatomical room of the University of Iowa, by the use of an expansion appliance exerting pressure across the palate, at a meeting of the Section on Stomatology of the American Medical Association at its last Chicago meeting, and this skull was examined by all who cared to do so. The experiment was performed in the presence of reputable men, and there can be no question about any of these facts.

I will not take your time further in discussing whether this result can be accomplished or not, because I am ready to do it, and let you be the judges. Only one word more, so that you may not be under a wrong impression: I would not attempt for a moment to get up before this audience, and give my opinion of the exact change in an anatomical specimen about which I did not know anything beyond post-mortem evidence. Without previous knowledge of the individual, this would be impossible.

I shall give a brief description of the appliance I use, in answer to Dr. Hofheinz' question:

Bands upon the canines and molars are connected upon each side by stiff bars. To these a plain, straight jackscrew is soldered firmly at the point of greatest constriction, and this produces pressure across the palate. Between the connecting bars and the teeth, I press in as much cement as possible, in order to make the support as rigid as it can be made. The jackscrew is turned until the pressure is felt, then, after a few minutes, it is turned again, until the patient feels the pressure more constantly; this is done twice daily at home. In this manner, I usually secure sufficient pressure in the course of four or five days to produce a noticeable separation between the central incisors; sometimes it takes seven days and sometimes two weeks, the rapidity depending on the individual. When the teeth are separated sufficiently, the patient is referred to a rhinologist for examination and, if he reports the nose widened sufficiently the appliance is left in position, sometimes for two weeks before it is taken off, and a retainer is placed in, on account of the tendency of the bones to spring back immediately if set free too soon. When the appliance is removed, a rubber plate is made to fit the sides of the teeth. As to the change in the nose, the only accurate evidence, outside of observation of the patient's ex-

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pression as reported, and the reports of the rhinologists, is a series of measurements made by Dr. Dean, who devised an apparatus for intranasal measurement that is very simple and effective. Dr. Dean found that nasal enlargement continued some time after we ceased to bring pressure to bear across the palate, in the case of a young girl of seventeen. His records as published show that there was a tendency to increase. In other words, the yielding of the upper bones continued as a result of the pressure below. So far as retention is concerned, I have had no trouble with the bones returning. There are so many other agents that come into play when once we get nasal breathing, that there appears to be little or no fear of their returning.

Dr. FERRIS. Are those upper molars carried in buccal occlusion with the lower jaw?

Dr. BROWN. Occasionally the upper molars are carried completely outside of the lower teeth; sometimes only the buccal occlusion is increased.

Dr. FERRIS. Would that not tend to return the teeth for the time being?

Dr. BROWN. I would not leave them that way; I am not advocating anything of that kind. The patient is told to keep wearing some sort of retention appliance as long as there is a tendency to return to previous conditions; how long this may be, depends on the individual and the occlusion.

As to radiographs taken before and after these operations, I have with me a number of slides showing these cases before and after operation, but because of the length of the paper and the large number of slides, I decided to leave out some of them, but they will be published, and, if the matter is of sufficient interest, I would be glad to show the slides. It appears to me that anyone who looks at some of these slides, which show the centrals spread apart and a distinct separation between the maxillary bones, must know that these bones were not that way before anything was done to the mouth. It would seem that everybody might understand that a radiograph taken before the operation would give an appearance in the region of the median palatine suture such as is plainly evident in these slides.

Dr. KEMPLE. I do not agree with Dr. Brown there. I have seen a number of radiographs where no artificial movement of the teeth has ever been attempted, that showed a decided light line, apparently through the median suture.

Dr. BROWN. With the central incisors apart that way?

Dr. KEMPLE. In some cases they are apart and in some together; and where there was a light line just as pronounced as it apparently would have been if the suture had been absolutely open. It seems to me that we have an opening of the premaxillary suture, but I question the possibility of opening the main maxillary suture. I do not, however, attach any particular importance to that point. It does not make any difference whether it is opened or whether it is not; if you get the improved condition, that is all you are after. But I do not believe that radiographs are convincing evidence that you have opened the maxillary suture.

Dr. BROWN. Dr. Cryer's suggestion with regard to the action of the tongue that has been referred to, is undoubtedly important. There can be no question of the possibility of its being an influential factor, but I am satisfied that the evi-

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dence presented here tonight points to many other influences that are active in these cases, and that cannot be ignored. Certainly the results obtained in dogs have an obvious bearing in this respect.

Dr. KEMPLE. In fact, I think Dr. Dewey experimented with monkeys also, and he is carrying his experiments over the present year and expects to report at the meeting of the American Society of Orthodontists in July.

Dr. BROWN. In answer to Dr. Dunning, I did not think that I left the impression that I stimulated the tissues in cases of acromegaly. I showed the case of acromegaly to prove the existence of some underlying factor in development which was vital, and the likelihood of its influence lying in the pituitary or in the associated ductless glands, and I showed the great similarity between the tendency to certain anatomical defects in the cases that he had under treatment and those which are practically hopeless—that was the idea. I would not for a moment leave the impression that I was undertaking to treat acromegaly by spreading the maxillary suture. As to the change in shape or the effect of pressure on the sella turcica, and more particularly the foramina at the base of the skull, anyone who examines the skull of a newborn child, and notes that these tissues are almost cartilaginous at that time, must appreciate that the form of the foramina through which important vessels and nerves must pass could readily be affected. When they are once formed, however, and bone development is complete, their form cannot be changed.

As to the question of the slow or rapid maxillary expansion, it seems advisable for me to state clearly that I have a profound respect for the great good the orthodontists are accomplishing. It is just possible that I value it even more than the orthodontists themselves, because the nature of my surgical work has led me to look a little farther in search of its beneficial effects; but I do not believe that any operator is warranted in taking a year, or two years perhaps, or at least a long period of time, to bring about the proper relief in the case now under consideration, if it can be secured more promptly. If orthodontists could see the necessity for immediate relief as those who are treating pathological, nasal, pneumonic, and nervous conditions are obliged to view it, I am sure they would make every endeavor to secure as much movement as possible. The vital consideration, after all, is not whether we are spreading the maxillary suture, or the palatal suture, or the intermaxillary suture as mentioned by some. We do not care what happens in this respect; it is what we accomplish in giving relief from pathologic conditions that is important—it is the *result*. Whether the orthodontists accept this method, whether they believe that the median maxillary suture is opened or not, the physicians who are treating these patients realize the great necessity for promptly relieving the pathologic affections of the nasal cavity and of the sinuses, because they know the result of troubles in these sinuses upon the lungs and bronchi. It is well known that the sinuses form breeding-places for the pneumococci. Since other pathogenic bacteria are present, these individuals always exhibit a tendency to recurrence of disease and infection from the sinuses, and are much more subject to infection in the bronchial region than others whose mouths and noses are normally developed. These

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bacteria live in the environment that the sinuses offer, and at the first opportunity of lowered resistance another infection occurs. It is therefore not for you to say whether the time required for maxillary expansion shall be one year or two years, if you can do it in two weeks, because the time element is often important. Nose-and-throat men are finding out that nasal relief can be given in a short time, and if the orthodontist will not do it, they will send their patients to the ordinary dentist and have it done.

With regard to the matter of occlusion, I do not think that anyone who knows me will question for a moment that I give proper consideration to the matter of occlusion. My contention is that by the method I advocate, we accomplish what the men who are dealing with these pathological conditions know must be done, and must be done as quickly as we can do it, and then is the proper time for the orthodontist to take hold of the case and establish as perfect occlusion as possible; the more perfect the occlusion, the more perfect will be the beneficial results obtained for the patient. The only difference between the orthodontist and myself is that I believe this result which we obtain to be more vital, and the first to be obtained in order to afford relief. Much as I respect occlusion, it is less important to my mind than the mental, physical, and nervous condition of the patient, and I would not hesitate to sacrifice occlusion for some of these benefits, just as the surgeon sacrifices a leg or an arm to save the patient. But fortunately we do not have to take such heroic measures, because we can spread the suture, and then have the orthodontist render the occlusion perfect by his routine methods.

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Organization	Amos Westcott	Syracuse	June 30, 1868
1st	B. T. Whitney	Buffalo	July 28, 1869
2d	L. W. Rogers	Utica	June 30, 1870
3d	W. B. Hurd	Brooklyn	June 29, 1871
4th	C. A. Marvin	Brooklyn	June 27, 1872
5th	J. G. Ambler	New York	June 26, 1873
6th	W. C. Barrett	Warsaw	June 25, 1874
7th	W. C. Barrett	Warsaw	July 1, 1875
8th	C. A. Marvin	Brooklyn	July 13, 1876
9th	L. F. Harvey	Buffalo	May 10, 1877
10th	A. M. Holmes	Morrisville	May 9, 1878
11th	C. E. Francis	New York	May 14, 1879
12th	O. E. Hill	Brooklyn	May 13, 1880
13th	O. E. Hill	Brooklyn	May 12, 1881
14th	L. S. Straw	Newburgh	May 9, 1882
15th	L. S. Straw	Newburgh	May 10, 1883
16th	L. S. Straw	Newburgh	May 14, 1884
17th	F. B. Darby	Elmira	May 15, 1885
18th	N. W. Kingsley	New York	May 13, 1886
19th	N. W. Kingsley	New York	May 11, 1887
20th	J. E. Line	Rochester	May 9, 1888
21st	E. D. Downs	Owego	May 7, 1889
22d	W. W. Walker	New York	May 14, 1890
23d	W. W. Walker	New York	May 13, 1891
24th	W. W. Walker	New York	May 12, 1892
25th	F. L. Van Woert	Brooklyn	May 10, 1893
26th	F. L. Van Woert	Brooklyn	May 10, 1894
27th	H. J. Burkhart	Batavia	May 9, 1895
28th	H. J. Burkhart	Batavia	May 14, 1896
29th	H. J. Burkhart	Batavia	May 13, 1897
30th	F. Le Grand Ames	Albany	May 12, 1898
31st	F. Le Grand Ames	Albany	May 11, 1899
32d	J. I. Hart	New York	May 9, 1900
33d	J. I. Hart	New York	May 10, 1901
34th	R. H. Hofheinz	Rochester	May 15, 1902
35th	R. H. Hofheinz	Rochester	May 14, 1903
36th	W. Jarvie	Brooklyn	May 13, 1904
37th	W. J. Turner	Brooklyn	May 12, 1905
38th	W. A. White	Phelps	May 11, 1906
39th	W. S. Rose	Schenectady	May 10, 1907
40th	L. Meisburger	Buffalo	May 8, 1908
41st	B. C. Nash	New York	May 9, 1909
42d	A. R. Cooke	Syracuse	May 10, 1910
43d	Ellison Hillyer	Brooklyn	May 5, 1911
44th	Charles F. Baylis	Oneonta	May 10, 1912
45th	Wm. W. Smith	Rochester	May 9, 1913

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CONTENTS.

PAGE

Address of the President 61
Clinics 44
Committees 204
Dental Examiners 204
Essays and Discussions—
"The Development of the Anatomical Articulator." By ELLISON HILLYER, D.D.S., Sc.D. 64
"Can the Illegal Practice of Dentistry be Limited by Law?" By R. OTTOLENGUI, M.D.S., D.D.S. 87
"The Operative and Post-operative Treatment of Pyorrhea." By T. B. HARTZELL, M.D., D.M.D. 97
"A Further Study of Sulfocyanate in Its Possible Relation to Dental Caries." By WM. J. GIES, M.S., PH.D. 142
"The Pathologic and Therapeutic Possibilities of Upper Maxillary Contraction and Expansion as Evidenced by Experiments upon Guinea-pigs, Rabbits, and Dogs, in Confirmation of Clinical Observations in Human Cases." By GEO. V. I. BROWN, D.D.S., M.D. 177
Executive Council, membership of 204
Fellows 206
Members, honorary 206
Officers, election of 10
" for 1913-14 204
Past Presidents 207
Presentation of Fellowship medal 4

PAGE

Report—Committee on Arrangements .. 22
Committee on By-laws 22
Committee on Clinics 22
Committee on Fellowship 4
Committee on Law 13
Committee on Legislation 23
Committee on Practice 116
Committee on President's Address 21
Committee on Publication 23
Committee on Scientific Research 141
Committee on Trained Nurses 22
Correspondent 126
Executive Council 9
Secretary 11
Treasurer 12
Reports from District Societies—
First District 25
Second District 30
Third District 33
Fourth District 34
Fifth District 35
Sixth District 37
Seventh District 38
Eighth District 40
Ninth District 42
Sessions—First Day, Morning 3
" " Afternoon 4
" " Evening 7
Second Day, Afternoon 7
" " Evening 8
Special Resolutions 24

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H. D. Lucas

TRANSACTIONS

OF THE

DENTAL SOCIETY

OF THE

STATE OF NEW YORK

FORTY-SIXTH ANNUAL MEETING

HELD AT

ALBANY, N. Y., MAY 1914

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TRANSACTIONS

OF THE

Dental Society of the State of New York.

FORTY-SIXTH ANNUAL MEETING.

FIRST DAY—Afternoon Session.

THE forty-sixth annual meeting of the Dental Society of the State of New York was opened on Thursday afternoon, May 14, 1914, in the assembly room of the Educational Building, Albany, N. Y.

The president, Dr. W. W. Smith, Rochester, called the meeting to order at 2 o'clock.

The Rev. Dr. DUGAN, Albany, invoked divine blessings on the deliberations of the society.

Dr. A. P. BURKHART moved that the calling of the roll be dispensed with, also the reading of the minutes of the last annual session. [Motion carried.]

The vice-president, Dr. A. M. Wright, Troy, took the chair, while the president, Dr. W. W. SMITH, read his annual address. [See pages 56 to 61.]

Dr. WRIGHT appointed the following as the Committee on the President's Address: Dr. Louis Meisburger, Dr. A. W. Twiggar, Dr. W. B. Dunning; after which the president, Dr. Smith, resumed the chair.

The next order of business was the report of the Business Committee, by Dr. H. J. BURKHART, chairman, who reported the program for the day.

Dr. BURKHART moved that the president of the society be directed to send telegrams of greetings and good wishes to both Drs. Jarvie and Hofheinz, who were just sailing for Europe on account of ill health. [Motion carried.]

The next order of business was the report of the Committee on Practice, by Dr. D. H. SQUIRE, chairman, Buffalo. [See pages 62 to 68.]

Dr. SMITH. We are honored with the presence of the chief executive of our state. It is my pleasure to present to you Governor M. H. Glynn, who will address you at this time. [Applause.]

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Governor GLYNN. *Mr. Chairman and brother alleviators of human suffering and human pains,*—Somewhere in one of his poems, Robert Burns calls toothache the "hellest of all diseases." I suppose you all know that poem, and, as saints, are the only people in history whose intercession and interventions are at all efficacious in saving people from the tortures of hell. I suppose, poetically speaking, according to Burns, that all dentists are saints. I know little or nothing about dentistry, but I know also that most politicians make the best speeches about the things of which they know least, for the reason that they are not hampered by facts and can give full swing to their imagination; but I am not going to try that today. I know nothing about dentistry, and do not intend to try to make a speech about it. I know this, however, that despite the fact that you made me governor, that despite the fact that clothed as one is in robes of tissue paper, wearing a crown of pasteboard, and sitting on a throne made of reeds and shaken by the winds, still that glory does not relieve one from the necessity of visiting the dentist, and I find my bills just as big when governor as when I was a private citizen.

I suppose there are a lot of things that the state should do for dentists. Dr. Downing tells me so every time the legislature meets, and I suppose Dr. Downing knows. On the other hand, if the state did everything that every society of New York state wants, all the laws passed each year by the legislature would fill this room if brought here. Still I recognize the fact that, as an army moves on its stomach, so our people move to a large degree on their teeth. I look upon dentistry as a branch of medicine. I believe that the same precautions thrown around medicine should be thrown around dentistry. I believe that by every attempt toward stopping the pain and the ravages caused by dental caries, you make yourselves eligible to the calendar of sainthood; if not religious sainthood, at least the sainthood of humanitarianism and good brotherly feeling. [Applause.]

Dr. A. S. DOWNING, Albany, assistant commissioner of education. The governor has made reference to legislation which should be enacted in my judgment for your benefit. I would modify that statement by saying that in my judgment this legislation should be enacted for the benefit of the people of the state. [Applause.]

Since this meeting has been in session, I have been asked time and again why the governor vetoed the dental bill, and I am going to tell you the reason. That is what you want to know. The bill did not pass the legislature early enough in the session for the governor to give full consideration to certain features of this bill which were presented to him as being detrimental to the good of the public. He did veto a bill which from every reason, as governor of this state, as a politician, as conserving the professional interests of dentistry and the public health, he ought to have signed; in spite of his desire to sign the bill he did veto it. That bill was known as Assembly Bill 1172. Yours was Senate Bill 1480, and he vetoed this also. What we need is a definition of what constitutes dental practice. We have the practice of medicine defined in the medical law, and we know when a man violates the medical law, because he must not do certain things which are known as the practice of medicine. Your bill proposed to give a definition of dentistry, but at the very

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last, after it was in his hands with some hundred-odd other thirty-day bills, and 'way down on the calendar, opposition arose to the bill because there was found in the definition this clause—"or maintaining a dental office for such practice." That is, practice of dentistry, in one instance at least, shall consist of maintaining a dental office for such practice. The governor simply had not time when he reached the bill to give it due consideration. It was put up to the governor that, if that bill became a law, all of the dental offices in this state maintained by men who are not dentists would be put out of business. This question was put before the governor as a business proposition, and he is a business man, but he had no time to consider the question. You could not get near him—very naturally—for a week or ten days, because he had to give consideration to these numerous bills. Here is the proposition: If this gentleman employs in an office only legal practitioners, and calls it—we will suppose it here in Albany—the Pearl Street Dental Parlor, and there are no practitioners operating in that parlor except legally licensed dentists, is it fair to put that parlor out of business?

VOICE. Sure.

Dr. DOWNING. You say "Sure," and I say "Sure," because I am administering the professional laws, but put that up to a man suddenly, one who does not know the reasons for the opposition to it, and he cannot help stopping to consider the question. The governor's position was that he wanted more time before he signed that bill; he wanted to know more about it. There is no evidence that he would not sign it another year, but the trouble is that you yourselves, this dental society, do not know what is going on in the legislature. That is where the trouble lies. You have an executive committee and a law committee to draft a bill, and in that bill are included certain things which the department wants, and we indorse the bill unqualifiedly, and the department gets the blame for the bill not being passed and signed. The dental society does nothing when it comes to advocating the bill; they rely on the Educational department to keep posted. I insist that your legislative committee are the people to be on hand here, and know what is going on. [Applause.] The trouble is that the rank and file of the dental profession in this state seem to take no interest in this matter. There should have been in the governor's hands, as soon as the bill passed, thousands of letters from all over this state indorsing this bill and asking him to sign it. As it was, the opposition was on hand all the time. You notice what the Educational department said in the memorandum to the governor. They sent over for a memorandum on the bill, and I wrote the memorandum, which was to the effect that—"The state Educational department unqualifiedly is in favor of the enactment of this bill into law, and most respectfully urges action by the governor, for certain reasons. This has the approval of the state department and all dentists—the state dental society—interested in the conservation of the public health."

You gentlemen rightfully say, If the state Educational department is administering the law, why could they not get this bill signed? It was not our bill; it was your bill, and we did more to pass this bill than you did. These are the facts in the case. Some of the Legislative Committee never knew that the bill

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was before the governor;—I think there is a member of this committee present who did not know what was going on. What you want is live men who will work.

Four years ago, there were certain measures that I believed would be good for the dental profession, and that should be enacted as law. One was the requiring absolutely four years of high-school study before admission into the dental schools. We are behind other states in that respect. We allow men to matriculate with three years of high-school training, and let them make up the fourth academic year in the dental school. You know that it is impossible for men to do academic work and dental work at the same time. Then we wanted in this bill another proposition: If a man secures a dental license before entering a dental school by fraud in any way whatever, he is guilty of a misdemeanor. As the law reads now, a man can go before the court of appeals on that point. We took away the license from a man who stole a preliminary educational certificate, entered a dental school, passed through the course, passed the state licensing examination, and began to practice dentistry. In the course of a few years it developed that this man had secured his preliminary educational certificate by fraud. The case was brought before the dental board, who recommended revocation of the license. This man showed a letter from a New York lawyer stating that he was not guilty of unprofessional conduct, and that a license could only be revoked for unprofessional conduct in any profession. The Board of Regents held that he was guilty of immoral conduct when he stole the certificate and engaged another man to take the preliminary examination for him. That case was taken to the court of appeals, and it is going to cost money to prosecute the case, and you will wonder next year why you do not get large revenue from the excess of dental fees over expense of administration. Now, we want in the law a clause that would specify that if a man is guilty of fraud in procuring such a certificate, his license can be revoked.

Another clause we wanted in the law was a provision to license men in New York who have been practicing twenty-five years in another state. It is only fair that a man who has practiced in the state of Pennsylvania or Illinois for twenty-five years as a reputable practitioner should come to this state and take the practical examination only, and, if he passed the board examination, be given a license to practice in this state. That clause was in the bill which the governor vetoed.

I want to tell you frankly, therefore, why the governor vetoed the bill: First, because the definition of the practice of dentistry contained the clause I referred to, and he did not have time to give a full, frank, open consideration to that clause. There was no time for a hearing. If we could have obtained a hearing, we could have produced strong arguments, and I believe he would then have signed this bill. This society was not informed of the contents of the bill and did nothing to speak of either for its passage or toward its being signed by the governor. I think the dental society makes a mistake when it does not keep its entire membership informed as to the dental legislation before the legislature and when such legislation gets into the governor's hands. Every member of the society should know about the bill, and what is to be done. I am frank to say

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that next year we shall put in a department bill which will contain these clauses, which in our administration for the benefit of the public and for your profession we believe to be absolutely right. We have tried for four years to get these clauses in the general dental bill which has been introduced by this society, and which has never been enacted into law—and you are suffering every year because of it. Next year, if I am alive and in my present position, I propose to submit to your legislative committee a proposition which we believe right and which you have acceded to year after year, amending the present statute to contain these clauses at least. We will put in, if we can to the satisfaction of everybody, a definition of dentistry, as we have a definition of medicine, and such other provisions as will tend to better administration and better conservation of the public health; we will try to eliminate from our bill everything that has any reference to the amendment to the penal code. If that needs to be amended, it can be amended afterward. [Applause.]

The next order of business before the society was the reading of a paper by Dr. JOHN J. CRONIN, deputy health commissioner of New York City, entitled "Municipal Control of Dental Clinics." [See pages 75 to 80.]

Motion was then made and carried to adjourn until the evening session at 8 o'clock.

FIRST DAY—Evening Session.

The meeting was called to order Thursday evening at 8 o'clock by the president, Dr. Smith.

The first order of business was the report of the Committee on Fellowship Medal, Dr. A. L. SWIFT, chairman, as follows:

Report of Fellowship Committee.

Mr. President and Members of the Dental Society of the State of New York,—The Fellowship Committee would respectfully report that they unanimously recommend that Dr. William Carr of New York become a Fellow of the Dental Society of the State of New York.

ARTHUR L. SWIFT, *Chairman,*
WILLIAM J. TURNER,
AUGUSTUS R. COOKE,
LOUIS MEISBURGER,
RUDOLPH H. HOFHEINZ.

PRESENTATION OF FELLOWSHIP MEDAL.

The President asked Dr. Swift and Dr. Turner to escort Dr. Carr to the platform, after which he presented the Fellowship medal to Dr. Carr, as follows:

The PRESIDENT. *Dr. Carr,*—The Fellowship Committee have deemed you worthy to become a Fellow of the Dental Society of the State of New York. In so doing they have recognized your long, arduous, and self-denying service in upbuilding our profession. Your efforts to raise the educational and ethical standards of the profession of dentistry, and to protect it and the public from unprincipled pretenders, are well known and appreciated.

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pleasures, the time and money sacrifice, and, vastly more than these, the sacrifice of health, are all considered. The part you have taken in building up the college which your name honors as its dean and the work for humanity you have accomplished in your surgical services are also considered.

By virtue of the office I hold, it gives me pleasure to present to you this medal, and declare you a Fellow of the Dental Society of the State of New York.

Dr. CARR, in accepting the medal, spoke as follows: *Mr. President and fellow members of the Dental Society of the State of New York,*—I am profoundly impressed by the sentiment expressed by our president and keenly appreciate the great honor conferred by this presentation, for which I thank you sincerely. This is an honor entirely unexpected, and one of which any member of the profession should be justly proud. I believe that this presentation is made as an expression of confidence and appreciation of my efforts in the construction and enforcement of the dental law. I shall not attempt to take up your time with a lengthy history of our committee work, but will simply outline without embellishment some facts that may interest you, and give some data to the future compiler of dental history.

Dr. Carr then read the report of the Law Committee. [See pages 16 to 21.]

Dr. Smith next introduced Dr. E. S. GAYLORD, New Haven, Conn., chairman of the National Relief Fund Committee, who made an appeal to the members of the society for contributions to the Relief Fund.

The next order of business was the reading of a paper by Dr. C. N. JOHNSON, Chicago, Ill., entitled "The Selection of Filling Materials for the Different Classes of Cavities." [See pages 87 to 92.]

Dr. Smith next introduced to the society Dr. WESTON A. PRICE, Cleveland, Ohio, who addressed the meeting in regard to the work of the Scientific Research Commission of the National Dental Association.

The society then adjourned until Friday, at 2.30 P.M.

SECOND DAY—Afternoon Session.

The meeting was called to order on Friday afternoon, May 15th, at 2.30 o'clock, by the president, Dr. Smith.

The first order of business for the afternoon session was the report of the Committee on Scientific Research, by the chairman, Dr. W. B. DUNNING. [See pages 101 to 104.]

The Chairman then introduced Prof. WM. J. GIES of Columbia University, who addressed the meeting, his subject being "Studies of Internal Secretions in Their Relation to the Development and Condition of the Teeth." [See pages 105 to 142.]

The President then introduced Dr. HOMER C. BROWN, Columbus, Ohio, president of the National Dental Association, who addressed the society on behalf of the coming meeting of the National Dental Association to be held in Rochester.

Motion was made and carried to adjourn until the evening session.

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SECOND DAY—Evening Session.

The meeting was called to order Friday evening, May 15th, at 8 o'clock, by the president, Dr. Smith.

The first order of business was the report from the Executive Council, presented by Dr. G. W. BEACH, secretary. [See pages 10 to 13.]

Dr. Beach moved that the report be accepted. [Motion carried.]

The next order of business was the reading of a paper by Dr. J. V. CONZETT, Dubuque, Iowa, entitled "The Technique and Relative Value of Gold Fillings and Inlays." [See pages 143 to 156.]

The next order of business was the Report of the Correspondent, Dr. E. B. PRENTISS—viz, "Nitrous Oxid Analgesia in General Dental Practice"—which was read by Dr. Hasbrouck. [See pages 157 to 167.]

The next order of business was the installation of the newly elected president, Dr. A. M. Wright, Troy, N. Y.

Dr. A. P. BURKHART moved that a rising vote of thanks be extended to Dr. Smith, the retiring president.

The motion was unanimously carried, and the society extended a rising vote of thanks to Dr. Smith.

Dr. A. P. BURKHART moved that the society adjourn until the second Thursday in May 1915.

The motion was carried.

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MINUTES OF EXECUTIVE COUNCIL.

ALBANY, May 15, 1914.

The Report of the Secretary was received and adopted. [See pages 13 and 14.]

The request of Dr. Frank L. Platt of the Panama-Pacific Dental Congress was received, and Dr. Van Saun was asked to present the matter to the society.

A motion was made to receive a communication from the Ninth District relative to the Legislative Committee.

The Secretary read a communication from the Allied Dental Council of Greater New York, and motion was made that the secretary be instructed to acknowledge the receipt of their communication.

Dr. G. H. Butler, the treasurer, reported, and the report was referred to the By-laws Committee. [See page 16.]

Dr. William Carr of the Law Committee reported. His report was received and referred to the By-laws Committee. [See pages 16 to 21.]

The report of the Registration Committee was received. The committee reported having arranged for registration and furnishing of badges at both the Hotel Ten Eyck and at the Educational building.

Motion was made that Dr. Gould and Dr. Wheeler investigate the subject of liability insurance, and present a report at the next annual meeting.

The same committee was to investigate the hiring of an attorney for prosecutions.

The report of the Clinic Committee was received, and was ordered made a part of the proceedings.

The report of the Fellowship Committee was presented and Dr. Wm. Carr was nominated to receive the medal.

A motion was made that the secretary of the society be instructed to send a letter of thanks to Dr. Gies for his work and assistance to the Research Committee.

The report of Dr. Daniel H. Squire, of the Committee on Practice, was received and referred to the main session for reading. [See pages 62 to 68.]

The Committee on Ethics reported.

Dr. Vanderpool, of the Committee on Arrangements, reported concerning storage of chairs and other material, and also the place of meeting. Report of the committee was accepted, and authorization given to properly store and repair the property of the society, and to have boxes with hinged covers made for proper care of pictures of the society.

Dr. Gross, chairman of the Exhibit Committee, reported, and the financial part of the report was referred to the By-laws Committee and the subject-matter to the secretary of the society.

A motion was made and carried that the chairman of the committee be instructed not to pay bills properly payable by other committees.

A motion was carried that the treasurer be authorized, on presentation of the proper voucher by the chairman of the committee, to pay the running expenses of the annual meeting.

Dr. Blatner, chairman of the Legislative Committee, reported the bills presented at the last session of the legislature.

Dr. R. Ottolengui's report as delegate to the National Convention was read and was ordered placed on file.

The report of Dr. Twiggar as chairman of State Institution Committee concerning the dental care of the inmates of public institutions of the state was made, and the committee was asked to take up the matter with the superintendent of prisons and with other state officials, to work out the much needed reforms concerning dental treatment as shown by the committee's report.

A motion was made that a committee of

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two be appointed to prepare necessary changes in the By-laws.

Dr. Gould and Dr. Wheeler were appointed by the chairman as such committee.

The matter of associate membership was referred to the same committee.

A motion was made that Dr. Butler, treasurer of the society, and Dr. Cooke, examiner, should wait upon the Regents and request a report of all moneys received and expended by the Regents for dental examinations.

A motion was made that the Business Committee be instructed to set aside a time for Dr. Gaylord to appear before the society.

A motion was made that this Council invite Dr. Price to present the matter of the Scientific Foundation and Research Commission before the State Society, and give the members of the various districts the privilege of contributing to the same, and that the districts be given credit by the State Society for the amounts subscribed.

Dr. Luther, of the Oral Hygiene Committee, reported. The report of the committee was received and placed on file.

A motion was made that the Oral Hygiene Committee be empowered to spend an amount not to exceed $500 for use in producing films, and the committee be authorized to operate or rent these films.

A motion was made that the Oral Hygiene Committee prepare a syllabus of lectures for use in connection with the films.

A motion was made that an honorarium of $200 be paid the secretary, A. P. Burkhart, and $100 be paid the treasurer, G. H. Butler.

A motion was made that the Scientific Research Committee be given $500 for the work of the coming year.

A motion was made and seconded that the recommendation to the Regents for the following Examiners of the Sixth, Eighth and Ninth Districts be approved:

Sixth District—A. M. Holmes, John B. West.

Eighth District—H. J. Burkhart, J. A. Sherwood.

Ninth District—E. G. Parker, C. G. Turner.

A motion was made that an error in the By-laws be corrected by adding to Section 4 of the By-laws, second paragraph, the words "reside," and the following amendment was proposed by Dr. Ottolengui:

"But a legal member of a district society in good standing may remove his residence, or practice, or both, without affecting his membership in the State Society."

A motion was made that there be added to Section 42 of the By-laws a new paragraph to read as follows:

"Practitioners of dentistry who are eligible to active membership in any district society shall be a member of but one district society, except that this shall not be construed to mean that a member having once been legally elected to membership in one district society, shall be compelled to change his membership because of change of residence and place of practice."

The following amendment to the By-laws was also recommended:

"There shall be no associate members elected in district societies except from outside the state of New York, from this date, May 15, 1914."

A motion was made that the Special Legislative Committee's report be adopted, and the committee be continued.

A motion was made that the State Library Committee's report be received and placed on file.

A motion was made that the Necrology Committee's report be received and placed on file.

A motion was made that the Law Committee of the district societies shall not draw on the treasury of the State Society's law fund during the coming year, the work being left in the charge of the chairman of the State Law Committee.

A motion was made that the report of the special committee to investigate the accounts of the Eastern Dental Association concerning their expenditures be adopted, and the committee be dismissed with the thanks of the Council.

A motion was made that the secretary of the State Society be instructed to make the usual arrangements with the S. S. White Co. for the publication of the proceedings of the society for the ensuing year.

We favor the adoption of the *Journal of the Allied Dental Societies* as an official organ, but do not see our way clear to meet

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their proposals at this session, because of financial reasons.

Dr. Wheeler, for the Committee on Trained Dental Nurses, rendered a report. The report decided against favorable action at this time and was received and placed on file, and the committee continued.

A motion was made that when the Special Legislative Committee prepare legislation, any new material that is incorporated besides that which it contained last year shall be submitted to the Executive Council for their indorsement before it is introduced to the Legislature.

A motion was made that the bills for the necessary expense of the Executive Council's session at Elmira be received and verified by the president and ordered paid by the treasurer.

The report of the Committee on President's Address was received, and the following recommendations were either approved or disapproved.

Recommendation No. 1, referring to the publication of a bulletin, was disapproved.

Recommendation No. 2, referring to the active membership of an individual in only one district society, was approved.

Recommendation No. 3, referring to the place of meeting, was approved—the meeting to be held as at present, in Albany.

Recommendation No. 4, referring to the creation of the office of president-elect, being inadvisable at this time, was disapproved.

Recommendation No. 5, in reference to the Necrology Committee, was laid on the table.

Recommendation No. 6, regarding changes in the By-laws, was approved: that any change in the By-laws made without objection at the first meeting of the Executive Council may be acted upon at a meeting of the Council held not less than twenty-four hours subsequently.

Proposed amendment to Section 49 of the By-laws, first paragraph, seventh line, after words "meeting of said Council"—"Except that an amendment, presented without objection at the first session of the Executive Council, may be acted upon at a meeting held not less than twenty-four hours subsequently."

Recommendation No. 7, regarding the continuance of the Special Legislative Committee, was approved.

Report of the By-law Committee was made by Chairman Chas. Bradshaw, and the report was accepted.

The following were named as the New York State Committee of the Scientific Foundation and Research Committee—Dr. H. W. Gillett, chairman; J. D. Kelly, Binghamton; O. W. McLean, Mt. Vernon; L. S. Blatner, Albany; M. L. Fay, Buffalo; W. S. Rose, Schenectady; L. S. Goble, Rochester; C. T. Van Woert, Brooklyn; W. B. Dunning, New York City; A. R. Cooke, Syracuse.

The recommendations from the district societies for the election of their committees for the ensuing year were approved. [See District Societies Reports, pages 37 to 55; also Officers and Committees for 1914–15, pages 168 to 170.]

The following were elected delegates to the National Dental Association meeting, to be held in Rochester, 1914:

Regular delegates for One Year—E. A. Smith, H. L. Wheeler, J. W. Canaday, and W. W. Smith.

Delegates for Two Years—Albert W. Twiggar, Louis Meisburger, C. F. Baylis, and A. C. Rich.

Alternates for One Year—G. A. Potter, W. C. Deane, C. K. VanVleck, and A. P. Burkhart.

Alternates for Two Years—Stephen Palmer, D. H. Squire, J. B. West, and W. S. Rose.

Drs. T. P. Hyatt and F. C. Walker were appointed tellers for the annual election of officers, which resulted as follows:

President—A. M. Wright, Troy.

Vice-president—Stephen Palmer, Poughkeepsie.

Secretary—A. P. Burkhart, Auburn.

Treasurer—George H. Butler, Syracuse.

Correspondent—L. M. Waugh, New York City.

G. B. BEACH, *Sec'y.*

ELMIRA, November 21, 1913.

Those present were H. P. Gould, J. B. West, J. W. Canaday, S. Palmer, H. L. Wheeler, A. C. Rich, B. S. Hert, and G. B. Beach. *Ex-officio members*—W. W. Smith and A. P. Burkhart.

A motion was made and carried asking the secretary to change any clerical errors made in revising the By-laws.

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Dr. Hert's motion was carried that we rescind the action to print a list of the registered dentists of this state.

A motion was passed that the Law Committee's report be epitomized before being printed in the proceedings, and that the work of revision be left to the Publication Committee. Dr. H. J. Burkhart was requested to furnish a list of all men in the state who have received the degree of M.D.S.

Motion that the preliminary report of Dr. Twiggar on prisons be received and referred back to him for a full report at the annual meeting, and that bills of the committee amounting to $12.20 be paid.

The state treasurer was instructed to pay the dues of the State Dental Society to the National Society for the year of 1914 on January 1, 1914.

A motion was carried that the Oral Hygiene Committee be allowed $100 toward expense of producing films for use of the district societies.

The Executive Council Committee of the State Society request the Legislative Committee to co-operate with the department of Education for passage at the earliest possible date, of legislation similar to that proposed in the regular session of the Legislature of 1913.

Adjourned to call of the chairman.

G. B. BEACH, *Sec'y.*

REPORTS OF OFFICERS AND COMMITTEES.

Report of the Secretary.

TO THE COUNCIL:

Gentlemen,—I herewith present for your consideration and information my annual report. All recommendations and general instructions passed by the Executive Council session of 1913 were duly taken care of in regular order.

The supervision of the manuscript for the printing of the amended By-laws adopted May 1913 was carefully attended to. A contract for 2000 copies at $65 was made with Auburn Printing Co. I took the liberty to prepare an index, and it forms a part of the printed By-laws.

During the year my many communications and numerous personal interviews with our genial president, Dr. Wm. W. Smith, have been to me interesting, and demonstrated clearly that our society made no mistake when it elected Dr. Smith president.

Our treasurer, Dr. G. H. Butler, shortly after the close of the May meeting deposited a renewal bond as directed by the Executive Council.

The publishers of the *Dental Cosmos* printed and distributed the proceedings of 1913 to all members, and in addition furnished me an additional number for future use. I recommend a renewal of the contract made with the publishers last year.

Attached you will find a bill for expenditures during the past year.

I have several communications which I will read for your information and general disposition.

Affiliation with the National Dental Association has made the New York State Dental Society an important factor in the National. Nearly all the delegates elected to represent New York at Kansas City last July were present. Circumstances arose in an attempt to organize a harmonious House of Delegates for the first session whereby all states represented were asked to select one of their number to represent his state. The New York delegates selected Dr. R. Ottolengui. He has prepared for your consideration a report covering his stewardship, a report worthy of your careful attention.

Our affiliation with the National Association has resulted in a very extensive correspondence with the National officers, and

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officers and members of sister state societies. There is every evidence that closer and more fraternal relations will prevail between state societies.

At the Kansas City National meeting a new section was created, known as "State Officers' Section." Presidents and secretaries of state societies were members of the first organization meeting. Officers were elected, Dr. C. R. Lawrence of Enid, Oklahoma, being made president, and I myself secretary of the section.

The presidents and secretaries of state societies are eligible to membership, with no expense to the respective state societies except as some western societies paid railroad and hotel expenses of some of their representatives.

The creation of this new section will be a material aid to state officers in the conduct of state meetings, because of the presentation and discussion of topics having a direct bearing on the best methods and needs for successful state meetings.

I have had more calls the past year from sister states for general information and for programs than at any period since my service as secretary. There was mailed to every president and secretary of state societies a program of our present meeting.

I find on examination of the numerous programs I have received from other states that nearly all reserve an evening for social purposes, usually a banquet. There is nothing better than a good, lively banquet to create a jolly social and fraternal feeling. I sincerely trust the incoming officers will take a banquet into consideration in making up the program of 1915. Let the banquet tickets be reasonable, however, and not prohibitive to some, as is sometimes the case.

To avoid expense I deferred sending the By-laws to the membership throughout the state until the month of April, at which time the preliminary notice was sent, and a copy of the By-laws.

The official program was mailed to each member, the essayists, and to prominent members outside of the state.

Blank reports were sent to all district secretaries, with request to furnish duplicate reports. I am pleased to report that all reports are in my hands, all neatly prepared.

At the request of the National officers, I distributed the receipt books furnished by the National for the collection of dues. A special letter of instruction was gotten up and sent to each secretary and treasurer of the district societies. Much confusion had arisen over the collection of dues which had to be cleared up, and from present indications there is a clearer understanding.

The duplicate list of membership furnished by the secretaries will be an aid when it comes to registration for admission to the literary sessions and clinics at the National meeting at Rochester next July.

It has been decided positively that only members in good standing in state societies shall be admitted. Every member wishing to gain admission must present a receipt showing him to be in good standing.

The chairmen of the various committees have been prompt in sending their reports, which in due time will be presented for your consideration.

The expenses for the year are as follows:

Auburn Publishing Co.	$54.61
Postage for sending By-laws, preliminary notices, programs, and addressing	49.25
General postage, expressage, messages, wrapping paper, twine, mucilage, etc.	20.69
Total	$124.55

I tender my sincere thanks to the officers of the State Society and the members with whom I have had correspondence or business of any kind for the very courteous treatment shown me.

Respectfully submitted,

A. P. BURKHART, *Sec'y.*

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Report of the Treasurer.

May 9, 1914.

"A." SOCIETY FUND.

Receipts.

Balance from 1913	$1216.09
Back dues	21.00
Exhibit Committee	283.04
Interest on deposits	73.13
First District, 1913 dues	794.00
" " 1914 "	848.00
Second " 1913 "	444.00
" " 1914 "	434.00
Third " 1913 "	122.00
" " 1914 "	114.00
Fourth " 1913 "	142.00
" " 1914 "	144.00
*Fifth District bal., 1913 dues	2.00
Fifth District, 1914 dues	174.00
Sixth " 1913 "	154.00
" " 1914 "	156.00
Seventh " 1913 "	188.00
" " 1914 "	240.00
Eighth " 1913 "	328.00
" " 1914 "	332.00
Ninth " 1913 "	108.00
" " 1914 "	118.00
	$6435.26

Disbursements.

Returned overpaid 1913 dues	$84.00
Expense bills of committee members	114.38
S. S. W. Dental Mfg. Co.	150.25
Printing and stationery	237.59
Stenography, etc.	49.44
Secretary's expenses	67.03
" honorarium	200.00
Treasurer's bond	17.50
" expenses	5.46
" honorarium	75.00
Membership fee for delegate to Int. Cong. School Hygiene	5.00
Committee on Scientific Research	500.00
Committee on Oral Hygiene	100.00
Dues to National Dental Association	1242.00
Balance in bank	3587.61
	$6435.26

*The Fifth District Society dues for 1913 were paid before the books were balanced in 1913, hence appeared in last year's report.

"B." LAW FUND.

Receipts.

Balance from 1913	$28.01
From First District	1150.00
" Second "	1350.00
Department of Education	1017.32
	$3545.33

Disbursements.

Expenses—First District	$2145.82
" Second "	1277.35
" Eighth "	106.65
Balance in bank	15.51
	$3545.33

"C." JARVIE MEDAL FUND.

Credits.

Balance from 1913	$55.00
From Erie bond	40.00
" N. Y. City bond	10.00
1 Erie gold bond	1000.00
1 N. Y. City bond	250.00
	$1355.00

Debits.

Bonds	$1250.00
1913 medal	50.00
1914 "	50.00
Cash balance	5.00
	$1355.00

RECAPITULATION.

Receipts.

Total balance 1913	$1299.10
Society Fund (A)	5219.17
Law Fund (B)	3517.32
Jarvie Fund (C)	50.00
	$10,085.59

Disbursements.

Society expenses 1913–14	$2847.65
Legal expenses	3529.82
1913 and 1914 medals	100.00
Total balance May 9th	3608.12
	$10,085.59

Examined and found correct:

C. A. BRADSHAW,
C. C. BACHMAN,
By-laws Committee.

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Report of the Law Committee.

May 1, 1914.

TO THE DENTAL SOCIETY OF THE STATE OF NEW YORK:

Mr. President and Gentlemen,—The Law Committee of the Dental Society of the State of New York beg to submit herewith their report for the year May 1, 1913, to May 1, 1914.

Your committee organized immediately after the election, appointed Dr. Wm. Carr chairman, and retained Wm. A. Purrington, Esq., as counsel for the society.

During the past year the legal complications arising from the prosecution of the dental law were so intricate that your chairman did not deem it advisable, as there were so many technicalities, to prepare a report, and therefore submits herewith the condensed tables and exhibits of our counsel, Wm. A. Purrington, Esq., together with our financial report.

Report of Counsel.

April 30, 1914.

DR. WM. CARR, Chairman Law Committee.

Dear Sir,—I submit herewith the report of the State Dental Society's legal matters for the year 1913–14 so far as they have been under my control or have been reported to me.

The annexed tables show, as usual, the status of cases conducted by my office or of which it has been advised.

Fines.

The following fines have been sent through you to the treasurer (see Annex "D"):

From prosecutions through my office ..	$1350
Fines outstanding at date of last report in cases tried by Messrs. Sparks and Fuller	550
Fines imposed in two prosecutions conducted against Harry B. Silver by Mr. Stanley C. Fowler—representing, it is believed, one Longnecker ..	600
	$2500
There are outstanding and payable (Annex "E")	800
Total of fines paid in and payable	$3300
From this total must be deducted the fine of $100 imposed upon Silver on his first trial. The judgment being reversed by the Appellate division, the fine had to be repaid	100
Reducing the above total to	$3200

* * * * *

I cannot close this report without expressing my appreciation of the aid given me by Mr. Rothenberg of my office, who has with capacity, and, what is more desirable, integrity and fairness, assisted me in all the work of the society.

Very truly yours,

W. A. PURRINGTON.

[Annexes to Counsel's report, also exhibits and tables prepared by the Chairman of the Committee, follow.]

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Prepared by W. A. Purrington, Counsel.

ANNEX "A."

(*a*) Cases in which warrants have been issued wherein it has not been possible to bring the accused to trial.

NAME.	COUNTY.	DATE OF WARRANT.	REMARKS.
Hunter, C. F.	New York	Nov. 25, 1902	Fugitive.
Cook, William R.	"	" 8, 1893	"
Adams, C. O.	"	" 12, 1897	"
Mitchell, Ormsby	"	Feb. 21, 1898	"
King, Archibald	Kings	Apr. 25, 1899	"
Randell, Maurice (1)	New York	May 4, 1900	
Seeley, Richard	"	Dec. 6, 1901	"
Levy, Mark	Kings	" 6, 1902	"
Packard, Frank D.	"	Jan. 26, 1904	"
Hackett, Alice (2)	New York	May 10, "	
Meade, Richard	"	Apr. 7, "	"
Maloney, John	"	Sept. 8, "	"
Dolan, John	"	Nov. 27, 1905	"
Haganour, Henry	Oneida	Sept. 24, 1907	"
Rubenstein, Louis	Kings	July 10, "	"
Marbo, Louis	"	June 26, 1908	"
Yueck Woo Wun	New York	Feb. 15, 1909	Warrant unexecuted.
Hocking, T. B.	Kings	Oct. 2, 1911	Fugitive.
Zacharopoulos, D. (3)	New York	Nov. 14, 1912	"
Nadelson, Harry	Kings	Aug. 12, 1914	"

(1) This man is reported to be dead.

(2) This woman's case had always been adjourned by the court on representations that she was too ill to be brought to trial.

(3) This man had previously been convicted in 1911 and fined $50.

Note 1.—"Fugitive" means one upon whom the police have failed to serve the warrant, presumably because the accused has fled the jurisdiction. Probably none of the defendants could be convicted now upon the evidence even if brought to trial. The names are carried from year to year for the sake of the record. One of them occasionally comes above the surface, as did one Joseph Feinstein. (See *Note 2*, below.)

Note 2.—The name of Joseph Feinstein appeared on this list in last year's report as a fugitive, a warrant having been issued July 8, 1911. The defendant surrendered himself June 11, 1913, and on October 6, 1913, was convicted and sentenced to thirty days.

ANNEX "A."—*Continued.*

(*b*) Cases pending on May 1, 1913, in which warrants were issued prior to that date, and their disposition, if any.

NAME.	COUNTY.	DATE OF ARREST.	REMARKS.
Irving, Alex. A.	New York	Mar. 15, 1913	Fined $100.
Schaefer, Wm. M.	"	Apr. 14, "	" $100.
Brown, Chas. H.	"	" 12, "	" $100.
Harlem Dental Co.	"	" 23, "	" $100.
Feinstein, Jos. (1)	"	June 11, "	Sentenced to thirty days.
Firth, Alfred G. (2)	Kings	Nov. 22, 1911	Fined $500.

(1) This man had been reported as a fugitive, but surrendered himself on June 11, 1913, as noted above.

(2) In Annex "A" of last year's report this man was reported as having an appeal pending. Since then, the appeal was decided in favor of the prosecution; the defendant pleaded guilty on October 7, 1913, and was fined $500.

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ANNEX "B."

Cases initiated since May 1, 1913.

NAME.	COUNTY.	DATE OF ARREST.	RESULT.
Burgman, Edw. G.	New York	May 16, 1913...	Fined $100.
D'Leen, Louis	Kings	July 9, " ...	" $200.
McPhail, Gilbert	"	" 10, " ...	" $50.
Martin, George	"	" 10, " ...	" $100 on non-registry charge.
Martin, George	"	" 10, " ...	Sentence suspended on non-posting charge.
Rhodes, Samuel R.	"	" 10, " ...	Sentence suspended.
Reiner, Jack	"	" 15, " ...	" "
Bellakowsky, M.	"	" 12, " ...	Fined $250.
Asfar, Joseph	"	Aug. 13, " ...	Sixty days in jail.
Muller, Edw. Geo.	"	" 13, " ...	Sentence suspended on non-posting charge.
Muller, Edw. Geo.	"	" 13, " ...	Sentence suspended on non-registry charge.
Nadelson, Harry	"	.....	Fugitive. Warrant issued Aug. 12, 1913.
Epstein, David	New York	" 19, " ...	Sentence suspended.
Gecker, Mary	"	Sept. 26, " ...	Discharged in magistrate's court.
Posner, Abraham	"	Nov. 25, " ...	Put on probation for one year.
Pekelman, Charles	"	" 28, " ...	Fined $50.
Williams, Wm. J.	Kings	Dec. 18, " ...	" $100.
Bookstein, Charles	"	" 16, " ...	" $50.
Scheld, William	"	" 16, " ...	" $200.
Zrake, William	"	" 31, " ...	" $500.
De Feo, Eugenio	New York	Jan. 2, 1914...	" $100.
Lambert, Fred C.	Bronx	" 20, " ...	" $100.
Berger, Henry	Kings	Dec. 24, 1913...	" $50.
Beatrich, H.	"	Jan. 30, 1914...	Sentence suspended.
Hackett, Clarence	New York	Apr. 29, " ...	Pending.

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ANNEX "C."

Result of Cases tried between May 1, 1913, and May 1, 1914.

NAME.	COUNTY.	FINE.	REMARKS.
Irving, Alex. A.	New York	$100	
Burgman, Edw. G.	"	100	
Harlem Dental Co.	"	100	
Schaefer, Wm. M.	"	100	
Brown, Chas.	"	100	
Epstein, David	"	.....	Sentence suspended.
Feinstein, Jos.	"	.....	Sentenced to 30 days.
Reiner, Jack	Kings	.....	Sentence suspended.
Martin, George	"	100	On non-license charge.
Martin, George	"	.....	Sentence suspended on non-posting charge.
Firth, Alfred G.	"	500	Served out his fine.
McPhail, Gilbert	"	50	
Gecker, Mary	New York	.....	Discharged in magistrate's court.
Muller, Geo. Edw.	Kings	.....	Sentence suspended on non-license and non-posting charges.
Muller, Geo. Edw.	"	.....	
Bellakowsky, M.	"	250	
Asfar, Joseph	"	.....	Sentenced to 60 days.
Posner, Abraham	New York	.....	Sentence suspended; put on probation for 1 year.
Scheld, William	Kings	200	
Pekelman, Chas.	New York	50	
Berger, Henry	Kings	50	
Bookstein, Chas.	"	50	
Beatrich, H.	"	.....	Sentence suspended.
Lambert, Fred C.	Bronx	100	
Williams, Wm. J.	Kings	100	
Rhodes, Samuel R.	"	.....	Sentence suspended.
De Feo, Eugenio	New York	100	
D'Leen, Louis	Kings	200	
Zrake, William G.	"	500	

ANNEX "D."

Table of Fines sent to the Society during the Year 1913–14.

(*a*) Cases tried through the office of W. A. Purrington, Esq.:

Irving, Alex. A. (May 2, 1913)	$100
Burgman, Edw. G. (May 28, 1913)	100
Brown, Chas. H. (May 29, 1913)	100
Schaefer, Wm. M. (May 29, 1913)	100
Martin, George (Oct. 7, 1913)	100
McPhail, Gilbert (Oct. 7, 1913)	50
D'Leen, Louis (Oct. 28, 1913)	200
Pekelman, Chas. (Jan. 19, 1914)	50
Berger, Henry (Jan. 23, 1914)	50
Bellakowsky, M. (Nov. 24, 1913)	250
Bookstein, Chas. (Feb. 6, 1914)	50
Williams, Wm. J. (Feb. 27, 1914)	100
Lambert, Fred C. (Feb. 19, 1914)	100

Note.—The district attorney has been unable to collect the fine of $100 imposed on the Harlem Dental Co. (See Annex "C.")

(*b*) Fines outstanding at date of last report in cases tried through the office of Messrs. Sparks and Fuller:

Hartley, W. S. (Oct. 3, 1912)	$150
Bischoff, F. W. (Oct. 15, 1912)	50
Crago, J. M. (Dec. 2, 1912)	150
Foster, John (Dec. 5, 1912)	50
Bellakowsky, M. (Jan. 31, 1913)	100
Dowd, James (June 28, 1912)	50

(*c*) Fines imposed in two prosecutions initiated and tried by a private attorney:

Silver, Harry B. (1) (Jan. 2, 1913)	$100
Silver, Harry B. (2) (Oct. 8, 1913)	500

(1) Defendant appealed from this conviction, which was reversed, and the fine returned by the society.

(2) Defendant's appeal from the second conviction is now pending.

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ANNEX "E."

Fines imposed and outstanding.

De Feo, Eugenio (April 3, 1914)	$100
Scheld, William (Jan. 9, 1914)	200
Zrake, William G. (April 30, 1914)	500

ANNEX "F."

Cases pending on May 1, 1914.

(*a*) Pending cases previously brought forward from past years, most of which are practically dead cases. (See Annex "A.")

(*b*) People *vs.* Griswold in the Court of Appeals.

(*c*) A number of investigations now in charge of the new agent.

Respectfully submitted,

W. A. PURRINGTON, *Counsel.*

Exhibits and Tables prepared by Dr. Wm. Carr, Chairman.

City warrants forwarded to Dr. G. H. Butler, treasurer, for fines from May 1, 1913, to May 1, 1914:

May 26, 1913	$600.00	
June 5, "	50.00	
July 7, "	200.00	
July 12, "	200.00	
Dec. 3, "	650.00	
Feb. 16, 1914	300.00	
Feb. 19, "	250.00	
Mar. 14, "	250.00	
		$2500.00

Receipts and Disbursements.

(May 1, 1913, to May 1, 1914.)

Moneys paid by Treasurer to Chairman:

May 28, 1913	$557.15	
July 12, "	920.52	
Aug. 4, "	180.96	
Oct. 1, " (for Comptroller)	100.00	
Nov. 8, "	187.86	
Dec. 3, "	194.17	
Jan. 6, 1914	$182.76	
Feb. 4, "	182.42	
Feb. 23, "	492.50	
March 14, "	197.13	
March 24, "	106.65	
		$3302.12

Received from Treasurer, and paid to Mr. Wm. A. Purrington, for retainer and disbursements:

Balance as per last report included in bill of July 1, 1913	$556.21	
Balance of bill of July 1, 1913	183.62	
Aug. 4, 1913	180.96	
Nov. 8, "	187.86	
Dec. 3, "	194.17	
Jan. 6, 1914	182.76	
Feb. 4, "	182.42	
March 14, "	197.13	
		$2045.82
Balance due Mr. Wm. A. Purrington, as per bill rendered, for March and April		376.81

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The Dental Society of the State of New York, *debtor*, to Dr. William Carr, chairman.

For moneys paid to Gaetano D'Amato, Miss Jacobi, Mrs. Atwell, Miss L. Tito, for detective services, carfares, photographs, fees for operations, county clerks' certificates, and witness fees:

May 10–May 31, '13	..	$111.50
June 2–June 28, "	..	150.80
June 30–July 26, "	..	230.20
July 26–Sept. 1, "	..	285.85
Sept. 1–Oct. 4, "	..	183.40
Oct. 4–Nov. 1, "	..	116.20
Nov. 1–Dec. 6, "	..	142.40
Dec. 6–Jan. 3, '14	..	160.50
Jan. 5–Feb. 2, "	..	285.60
Feb. 2–Mar. 7, "	..	275.85
		$1942.30

Carried forward	$1942.30
Less amount paid to Dr. Carr, Feb. 23d, as above .	492.50
Balance due Dr. Carr	$1449.80
" " per last report	4225.42
Total balance due Dr. Carr	$5675.22

Your chairman refrains from making a report upon the bill introduced in the last Legislature, as this will be properly made by the chairman of the Legislative Committee.

I would state that I have not charged the society for telegrams, telephones, carfares to Albany, and other expenses incident to securing the passage of the bill in the last Legislature, nor for special detective work in the interests of the society.

Owing to the charges that have been made against Mr. D'Amato, he was suspended as soon as the charges were made, and he is not now in our service. Your chairman has secured the services of an ex-Pinkerton detective, who is now doing efficient work not only in Brooklyn, but in New York.

Respectfully submitted,
WILLIAM CARR, *Chairman.*

Report of Committee on President's Address.

ALBANY, N. J., May 14, 1914.

TO THE COUNCIL:

Your committee appointed by the chair to consider and report on the recommendations contained in the Address of the President desires to congratulate this society upon its able presentation. It exhibits a watchful interest in the welfare of the society and the profession generally.

We respectfully report upon the following recommendations:

(1) The publication of a bulletin in the discretion of the Council is approved.

(2) The active membership of an individual in only one district society is approved.

(3) The committee feels that our meetings should be held in the capital city of the state.

(4) The suggestion concerning the creation of the office of President-elect seems inadvisable at the present time.

(5) We approve the discontinuance of the Necrology Committee.

(6) We approve that the By-laws be changed so that a recommendation presented without objection at the first session of the Executive Council may be acted upon at a meeting held not less than twenty-four hours subsequently.

(7) The continuance of the Special Legislative Committee, with power to prepare a bill in accordance with the president's suggestions, is approved.

Respectfully submitted,
LOUIS MEISBURGER,
WM. B. DUNNING,
ALBERT W. TWIGGAR,
Committee.

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Report of the Fellowship Committee.

TO THE COUNCIL:

The Fellowship Committee would respectfully report that they unanimously recommend that Dr. William Carr of New York become a Fellow of the Dental Society of the State of New York.

ARTHUR L. SWIFT, *Chairman*,
WILLIAM J. TURNER,
AUGUSTUS R. COOKE,
LOUIS MEISBURGER,
RUDOLPH H. HOFHEINZ.

Report of Committee of Arrangements.

TO THE COUNCIL:

Gentlemen,—The Committee of Arrangements beg to submit the following report:

Fixtures in charge of committee are seven chairs, two portraits, two easels, new; place cards, combination board, new. Until this time the fixtures have been stored free of charge by the Cleveland Dental Manufacturing Co., but they having moved to new quarters the committee had to store them in a storage house until your committee should select a permanent place for them.

During the year the committee had the two portraits put in a temporary condition, and recommend that they be reframed if they are to be preserved for future use.

Upon advice of the president of the society, this committee did not have the chairs repaired, as they were not to be used at this meeting.

Respectfully submitted,
GEO. VANDERPOOL, *Chairman*.
MORTON VAN LOAN.

Report of Clinic Committee.

TO THE COUNCIL:

The clinics for this year will be as follows:

Dr. L. M. Waugh. "The Oscillating Bite as a Means of Producing Anatomic Occlusion."

Dr. V. E. Mitchell. "The Artificial Restoration of Lost or Missing Tissues in Congenital Cleft Palate."

Dr. H. T. Stewart. "The Relation of Riggs' Disease to Removable Bridge Work."

Dr. F. H. Nies. "Baking of Porcelain Fillings on a Highly Refractory Model Without the Use of Metallic Matrices."

Dr. C. E. Allen. "A Heating Unit to Replace the Alcohol Lamp on the Bracket Table."

Dr. Ira J. Coe. "An Abbreviated Dental Code."

Dr. F. M. Willis. "Contour Amalgam Fillings, Using High Grade Alloys, Thoroughly Mixed in Fifteen Seconds with a New Mechanical Mixer, and an Original Matrix which May be Applied to One Approximal Surface or Both."

Dr. A. P. Burkhart. "Gilmore Attachments in Removable Work, and Methods for Safety and Accuracy in Divesting Crowns and Bridge Work."

Dr. C. K. Buell. "Hollow Swaged Plates with Goslee Teeth."

Dr. J. W. Beach. "Removable Interdental Bridge.'

Dr. H. E. S. Chayes. "Paralleling of Abutments for Fixed and Removable Bridge Work by Means of the Parallelometer."

Dr. A. W. Twiggar. "Porcelain Tip."

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Dr. Theodor Blum. "Infiltrative and Conductive Anesthesia with Novocain."

Dr. Twiggar is to give his clinic on Friday morning only, and Dr. Blum on Saturday morning only.

I have had printed the following: Tags indicating the groups to which members will be assigned in witnessing the clinics; small instruction sheets regarding the clinics; large cards to be tacked on each clinic room door.

Am enclosing bills as requested by you.

S. W. VAN SAUN, *Chairman.*

Report of By-laws Committee.

TO THE COUNCIL:

The Committee on By-laws beg to report that we find the report of Dr. G. H. Butler, treasurer, correct. The report and vouchers of the Exhibit Committee for 1913 meeting is correct and audited. The report of the Clinic Committee with attached bill for expenditures we find correct.

The Secretary's Report is also correct, and passed.

We suggest that all bills against the society be itemized to enable the committee to properly understand the various bills intended for auditing.

Respectfully submitted,

C. A. BRADSHAW, *Chairman.*

Report of Committee on Ethics.

TO THE COUNCIL:

There has been nothing reported during the past year requiring action by this committee.

Respectfully submitted,

J. N. GARLINGHOUSE, *Chairman.*

Report of Committee on Trained Nurses.

TO THE COUNCIL:

The committee respectfully reports that as the bill which gives a definition of dentistry has been vetoed by the Governor, it does not consider it wise to introduce legislation for the purpose of creating dental nurses at the present time. As a further reason for our attitude upon this subject, we call attention to the fact that a bill to legalize dental nurses has been introduced in the Massachusetts legislature for three successive years, only to be defeated each time.

H. L. WHEELER.

Report of Publication Committee.

TO THE COUNCIL:

Gentlemen,—In accordance with the recommendation of the Executive Council in May 1913, a contract was made with the S. S. White Company for the reporting, publication, and distribution of the printed proceedings for the session of 1914. The bill, covering the addressing and postage, was paid by the treasurer, Dr. G. H. Butler.

Dr. L. P. Anthony, representing the S. S. White Co., will be present, and report the sessions of 1914.

Your committee recommends a renewal of the present contract for the session of 1915.

Respectfully submitted,

A. P. BURKHART, *Chairman.*

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Report of the Legislative Committee.

TO THE COUNCIL:

The Legislative Committee begs to submit the following report for the year 1913–14.

During the session of the Legislature the following bills relating to the practice of dentistry have been introduced:

Assembly Bill No. 713, Pr. No. 741, adding a new section to the education law requiring local school authorities of first-class cities to establish in each public school a dispensary and dental laboratory by which each pupil may receive treatment without charge. This bill was killed in committee.

Assembly Bill No. 1173, Pr. No. 1270, amending the public health law by providing that for certain applicants for dental certificates the examination shall be in practical operative dentistry only. This bill was passed by both houses, but vetoed by the Governor.

Senate Bill No. 576, Pr. No. 623–1480, amending the public-health law relative to the definition of the practice of dentistry, the appointment of members of the state board of dental examiners, licenses, correction of books of dental registry, and penalties. This bill passed both houses, but was not signed by the Governor.

Assembly Bill No. 210, Pr. No. 210, amending the penal law, by permitting the sale of cocain or eucain to a licensed dentist upon his or her written order. This bill died in committee.

Respectfully submitted,

L. S. BLATNER, *Chairman.*

Appended will be found copies of the above-defined bills.

Report of the Committee on Scientific Research.

The Committee on Scientific Research has the honor to submit herewith its financial statement for the year 1913–14, and to report that the work of the past season has been carried on under the direction of Prof. William J. Gies of Columbia University, New York City. A detailed report of Professor Gies' work will be presented to the society on May 15th.

It seems proper to inform the Council that the expense of procuring animals for experimental purposes, the feeding and care of the same, etc., has exceeded by a considerable sum our appropriation for the current year. This deficit has been met by Columbia University, through its regular appropriation for research in biological chemistry. Our society, our profession, and thereby the public, are indebted to Columbia University for their liberal and cordial support in forwarding our work.

The committee recommends the renewal of the appropriation of $500 to meet expenses for the continuance of Professor Gies' work during the coming year.

Respectfully submitted,
WM. B. DUNNING, *Chairman,*
ARTHUR H. MERRITT,
L. M. WAUGH, *Committee.*

FINANCIAL STATEMENT.

May 14, 1914.

Receipts.

May 6, 1913, cash on hand		$10.00
Dec. 4, " check from society		500.00
		$510.00

Expenditures.

Dr. Sergius Morgulis, research work.		
Dec. 1, 1913	$100	
Feb. 1, 1914	100	
Apr. 1, "	100	
	$300	
May 5, " Dr. W. J. Gies, sundries	100	
		$400.00
Cash on hand May 5, 1914		$110.00
Due Morgulis June 1, 1914, balance on research work		100.00
June 1, 1914, actual balance at end of season		$10.00

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Report of State Library Committee.

To the Dental Society of the State of New York:

Mr. President and fellow members,—This committee, which was appointed only last year, is for the purpose of lending aid to the state library at Albany, in recommending such books as are approved by the best men in our profession.

The state medical library is not only willing but anxious to help us, and has already gone ahead and purchased over one hundred volumes, where at this time last year there was not a single work of reference pertaining to dentistry.

It is the aim of the committee to make the library a place where the profession may avail themselves of all kinds of works of reference, and this without any expense to anyone.

New York State Medical Library.

(Founded May 1891 by act of Legislature.)

J. I. Wyer, Jr., *Director*,
Frances K. Ray, *Librarian*.

Advisory Council—Dr. Albert Vander Veer, Dr. G. E. Gorham, Dr. Samuel B. Ward, Dr. A. W. Elting, Dr. Henry Hun.

Hours of opening. Each weekday (Christmas, Thanksgiving, and Fourth of July excepted) from 9 A.M. to 6 P.M. and on Tuesdays and Thursdays (except during July and August) until 10 P.M.

Loans. Books may be borrowed (preferably through local libraries) by any licensed physician in the state, by full-time instructors on the faculty of any medical college, members of the house staff of any hospital, registered and certified nurses, or anyone engaged in medical work, who offers suitable references and credentials.

Transportation. The borrower shall pay all transportation charges, use such care in packing as to guard against injury in transportation, and pay for books lost or damaged.

Length of loan. The period of loan is two weeks, subject to one renewal for the same period; but all books must be returned at the earliest date consistent with the special study for which they are borrowed.

Physicians coming to Albany from a distance to use the library will find it to their advantage to notify the librarian in advance, as to the books or subjects desired and the date of the prospective visit.

Library of Surgeon-general's Office, U. S. A. Physicians wishing books from this national medical library may obtain them for two weeks through this or any public library by paying express charges both ways.

Gifts. Physicians are earnestly requested to send gifts of books, periodicals, or reprints. Even single volumes or odd numbers of periodicals of little value to the owner may help to complete valuable sets.

Respectfully submitted,

Charles E. Allen, *Chairman*.

Report of Committee on Dental Service in State Institutions.

To the Council:

We are submitting a report embodying the result of our investigation of public institutions more or less supported by state finances, relative to the dental attention to their inmates.

There are fourteen state hospitals, which are conducted chiefly for the insane and feebleminded under the state board of charities, which have irregular dental services by anyone who happens to be selected by local management without any examinations or competition. The correspondence in this matter is attached to the report, Dr. Pilgrim of the Hudson River State Hospital at Poughkeepsie being the authority consulted.

We mailed independent of the above twenty-two letters, inclosing a printed blank to fill out for return, to a corresponding number of institutions, the names of which we secured from the state superintendent of Prisons and the state board of Charities.

We received in return twenty-one of the twenty-two sent out; the one omitted is unimportant. In preparing the blank for return answers, we tried to cover the phases of the

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subject that in our judgment your body most wished to know, and the answers in the main have been quite satisfactory.

The question blank was as follows:

Date.....

Name of institution.....

Address.....

Are the inmates of your institution receiving special attention to their mouth and teeth?

Have you a room especially equipped as a dental office?

Is the work done by an inmate of the institution, a general practitioner of the community, or by someone especially appointed?

Is he compensated by the individual patient or does he receive a stated salary?

If a salary, how much (if not impertinent)?

To whom is the dentist immediately responsible—the physician, warden, superintendent, or whom?

Are both branches of dentistry being performed, operative and prosthetic (mechanical)?

....
Name. Office.

A summary of the results are as follows:

Nearly all of the institutions answering are giving some attention to dental requirements among their inmates. About 75 per cent. of the institutions are attended by dentists in the neighborhood, and, in part at least, services are paid for by the inmates, the remainder being treated by convicts without pay or by someone who is being paid entirely by the state. A few of the institutions have an especially equipped dental room, but most of them have none or the crudest kind of equipment.

Four, at least, are being attended by convicts; namely, Dannemora Hospital and Dannemora State Prison—population about 1500—have one George W. Shann, a non-graduate and an unlicensed man, with only such experience as may be gained in portions of two years in college.

Sing Sing Prison—1349 inmates—has a man who has never been to college—unlicensed of course—who is doing a great deal of work, and indeed is busy all the time. While the written statement says he does operative work only, he has the mechanical work done in a local laboratory, doing the necessary work with the patient himself.

Auburn Prison—about 1200 inmates—has one H. B. Keler, a convict, who is registered in New York county, but is not registered in the county where he works.

While this report is not the product of personal inspection, it shows substantially the real conditions, which suggest two or three questions which may be appropriately asked—

(1) Can and should the state permit her own institutions to break her laws?

(2) Is it just to the patient or to the profession to have an untrained, unlicensed, and irresponsible man doing this work?

Question 3 may be comprehended in the foregoing, but it seems worthy of liberal consideration—

(3) Does it not seem worth while for the State Society to insist on a legal practitioner for each institution, or if the convict talent is to be utilized, should there not be someone of legal and practical standing—in a general way—to whom such convicts should be responsible, and not to a physician or to some layman superior, neither of whom have much intelligence about the needs of dental professional work?—this is the humiliating phase of it.

We would recommend that this matter be taken up with the superintendent of Prisons for the state penal institutions and that legal professional talent be obtained for each institution by a competent practitioner if possible. And for those institutions under the state board of Charities a proper inspection by someone appointed for the purpose.

Our State Dental Society and the profession generally are urging oral hygiene and dental prophylaxis for the preservation of health and comfort of humanity in the very largest way, and have by a campaign of education and constructive legislative work gotten laws on the statute-books for the protection of the public against abuses in the fields of dental treatment—and yet the state is assuming to do itself what it is denying the citizen!

Can proper dental attention be given the charges of the state by untrained men with no moral or legal responsibility, and with no one to supervise who has a right to an opinion in virtue of training, as to proper dental services?

If a productive man depends on good health, and good health depends so largely on a healthy mouth and good teeth, then why should not more responsible attention be given to the inmates of our state institutions, in order that they may have the largest possible chance to make good?

We believe that the non-penal places of detention are being fairly well cared for, but as

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there is no one qualified or obliged to inspect the dental services given them, and as they are outside the ordinary competitive relationship, then even this field should receive some supervisory attention. But as to the penal institutions where the work is being done so largely by the inmates, it is a humiliating disgrace to the state as well as the profession, and should be stopped. For our State Dental Society to stand by and look on, "waiting" and not "watching," while the state commits a violence against society as well as the profession, is hardly commendable.

Suppose the state should take one of its criminal inmates and place him in charge of the medical service; or a minister inmate and make him the chaplain, or some other professional man who is a criminal inmate—*e.g.* architect, lawyer, etc.—would not these respective professions rise up quickly and stamp it out? I believe they would, and very *justly* so, or stand convicted of insincerity and disloyalty. We believe that in each of the penal institutions where it is large enough —and nearly all of them have a thousand or more—there should be someone appointed who would give his whole time to the work. A competent, responsible person could render valuable service to the state; all talent among the inmates could also be used in its proper place.

We also believe that there should be a general supervisor over the twenty-five or more institutions where the work is being done by persons picked up wherever they may be gotten, most cases perhaps successfully, others doubtful.

There is very much to be said on this subject, and we would not try to say it all, but we do hope that your body will give active attention to the matter, and put dentistry in our state institutions in a position to command respect outside as well as inside.

There is no definite tenure of office of those who do the work, merely holding on from day to day, preventing, therefore, any policy or system being followed.

Respectfully submitted,

ALBERT W. TWIGGAR, *Chairman*,
STEPHEN PALMER,
JOHN B. WEST.

Report of Special Legislative Committee.

TO THE COUNCIL:

Gentlemen,—The Special Legislative Committee appointed for the consideration of the recommendations contained in the address of Dr. Ottolengui at the last meeting of the State Society and for the investigation of the laws of other states relative to the practice of dentistry begs to report as follows:

The meeting of this committee was held at the Hotel Iroquois, Buffalo, N. Y., on Tuesday, January 27, 1914, all members being present.

Statement of the object of the meeting was made by the chairman, and, by common consent, sections of Dr. Ottolengui's paper read at Albany, May 1913, were read as bearing upon the recommendations for the proposed law.

The matter of annual registration was considered as the vital point of the proposed legislation, and the committee voted to report favorably thereon to your honorable body.

It was also ordered that the matter of annual registration be brought up at the annual meetings of the various district societies for an expression of individual opinion thereon, and that the committee continue its investigation of similar laws in other states, with the intention of reporting its findings at the annual meeting of the State Society.

Senate Bill No. 854 was presented for consideration, and a large number of minor changes were made. It was voted to cooperate with the Legislative Committee in securing the introduction of the law as amended.

The annual registration proposition has been brought to the attention of the district societies in a circular letter from the president of the First District, and action has been taken thereon.

Attached hereto find reports from the district societies showing their attitude in relation to further legislation.

Respectfully submitted,

WILLIAM CARR,
A. R. COOKE,
ELLISON HILLYER,
R. OTTOLENGUI,
H. J. BURKHART,
Committee.

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(*First District.*)

NEW YORK, April 14, 1914.

My dear Dr. Cooke,—In reply to your note of April 10th, I give below the substance of the resolution regarding annual registration which was adopted by the society.

RESOLVED, That this society is in favor of some form of annual registration at two dollars per year, and an executive officer at Albany to have charge of registration and prosecution.

Trusting that you will be in favor of this step in what we hope to be the right direction, I am

Yours very truly,

J. RUSSELL WATSON, *Corr. Sec'y.*

(*Second District.*)

BROOKLYN, N. Y., May 12, 1914.

Dear Doctor,—Your letter to Dr. Holbrook has been forwarded to me. The resolutions which were adopted were as follows:

RESOLVED, That the society approves of the plan of annual registration of general practitioners of dentistry.

RESOLVED, That the society approves of the plan of registration of mechanical assistants, and of licensing and annual registration of dental mechanics.

RESOLVED, That the society approves the plan for revocation of licenses.

The other resolutions were rejected. A full report of Dr. Ottolengui's paper and discussion was published in the *Items of Interest* for December 1913 and January 1914.

Respectfully,

F. O. KRAEMER, JR., *Rec. Sec'y,*
225 Schermerhorn st., Brooklyn.

(*Third District.*)

April 30, 1914.

Dear Doctor,—Yours of April 25th at hand. Action by the Third District was unfavorable to the change in the dental law as outlined in the circular letter received from the First District.

Very truly yours,

J. W. CANADAY, JR., *Sec'y.*

(*Fourth District.*)

SCHENECTADY, N. Y., April 16, 1914.

Dear Doctor,—At the annual meeting of the Fourth District Dental Society of the State of New York, held at Glens Falls, N. Y., January 20, 1914, a request was received from the Second District Society for consideration of a paper read by Dr. Ottolengui at a recent meeting of that society under the title "Some Suggestions for the Improvement of the Dental Law of New York and Other States."

The paper was duly considered, and the following resolution was adopted:

RESOLVED, That this society does not approve of any proposed change in dental legislation as coming from any one individual, but refers the matter to the Special Legislative Committee appointed for the purpose by the Executive Council of the State Society.

Respectfully submitted,

EARL TIMESON, *Sec'y.*

(*Fifth District.*)

The following resolution was adopted at the April meeting of the Fifth District Dental Society, held in Syracuse:

RESOLVED, That the Fifth District Dental Society favors annual registration with fee of $2.00, the maintenance of an executive officer recommended by the Dental Society of the State of New York to attend to registrations and prosecutions and paid *pro rata* from the fees collected in the various districts.

A. C. HITZELBERGER, *Sec'y.*

(*Sixth District.*)

April 29, 1914.

Dear Doctor,—In reply to your letter of the 26th inst. pertaining to action regarding the circular letter from the First District, I will say that the Sixth District passed a motion that our representative be instructed to favor legislation along the line of the communication.

Very truly yours,

JOHN D. OGDEN, *Sec'y.*

(*Seventh District.*)

ROCHESTER, N. Y., April 21, 1914.

Dear Dr. Cooke,—Referring to your letter of the 29th ult., the following resolution was passed at the meeting of this society held on the 18th:

RESOLVED,—That the Seventh District Dental Society favors annual registration of dentists, details to be worked out by the Special Legislative Committee of the State Society, to whom this resolution is referred.

Sincerely yours,

C. A. HOWLAND, *Sec'y.*

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(*Ninth District.*)

PEEKSKILL, N. Y., April 29, 1914.

Dear Doctor,—At the meeting of the Ninth District Dental Society, held in New York City, February 13th, the following action was taken on Dr. Ottolengui's suggestion:

Moved, seconded, and carried that the Legislative committeeman be urged to use his best efforts to procure a dental law satisfactory to the societies by following the proper channels; also that the annual registration features of the bill be indorsed.

Thinking that this is the desired information, and with kindest regards, I am

Fraternally yours,

L. W. HELMS, *Sec'y.*

Report of the Committee on Necrology.

UNTIL each district has a committee on necrology to report annually to the corresponding committee in the State Society, it will be difficult for the latter in our reorganized society to give such definite data as has hitherto characterized its annual reports.

We have been called during the year to mourn the loss of the following members:

Dr. JAMES W. HINE died in Albany, N. Y., June 4, 1913, in his fifty-sixth year. Dr. Hine was a man greatly beloved for his noble qualities of mind and heart, and was very popular in dental, masonic, and church circles.

Dr. J. G. ALDCROFT died in Hudson, N. Y., Jan. 27, 1914, at the age of fifty-one. He was graduated at the University of Pennsylvania in 1884, and practiced all his life in his home city, where he was highly esteemed in professional, social, and civic affairs.

Dr. GEORGE A. FLETCHER died suddenly March 15, 1914, at his home in Albany. For the last five years he specialized in orthodontia, with pronounced success. He was a prominent member of the Tabernacle Baptist Church.

Dr. SAMUEL W. WHITNEY died in Albany, October 1, 1913. He was a careful and skilful dentist, much beloved by a large, loyal, and exacting *clientèle*. Although modest in society work, he was esteemed as highly capable by his brother practitioners.

Dr. CHAS. F. WHEELER died in Saratoga in October 1913, at seventy-five years of age. In professional attainment and skill as an operator, Dr. Wheeler ranked very high. He numbered among his personal friends many men of the very highest rank in the profession.

Dr. A. FREEMAN FOOTE died at his home in Brooklyn, June 30, 1913. Dr. Foote belonged to several dental societies, and was especially active in the work of free dental clinics, devoting to this cause much time and energy.

Dr. L. C. JONES was a life member of the Seventh District Dental Society, and always regular in his attendance at dental meetings. He was identified in the activities of the Baptist Church as well as generally in the affairs of the village of Wolcott, where he practiced.

Dr. J. L. SIGSBEE of Canajoharie died May 6, 1914. He had practiced in Canajoharie for over forty years, retiring from practice a few years ago. He was an estimable man, a good dentist, and a life member of the Fourth District.

Dr. PETER SLOAN died November 14, 1913. He practiced at Canajoharie, was a charter member of the Fourth District Dental Society, was made its secretary in 1870, and its president in 1876. He was a successful dentist, well liked by his *confrères*, and at the time of his demise was a life member of the Fourth District.

Dr. J. WALSH of Newburgh, who died during the year, is the first loss that the Ninth District has sustained by death. Dr. Walsh was a charter member of this district.

The First District has lost during the year the following members: Drs. C. A. DuBois, J. H. Frees, H. Phillips, G. H. Rich, and H. H. Sisson.

Dr. CHARLES A. DUBOIS was a most faithful member of the First District Society, and at one time its president. He was a regular attendant at the meetings of the State Society during the many years of his member-

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ship. He was quiet and unassuming in his manner, but genial toward those who know him, and his friends respected him as a type of the strictly ethical dentist, to whom the golden rule had a definite meaning.

Dr. FRANK L. SIBLEY of Rochester died at his home on March 3, 1914, just at the beginning of the forty-fifth year of his life. He was graduated in 1894 from the dental department of the University of Buffalo, and located in Rochester, where he secured a large and loyal *clientèle*. He joined the Seventh District Society, which as time went by honored him with the successive offices conferred upon an efficient and popular dentist. Dr. Sibley was a friend of everybody, a Mason of high standing, and a man who has been sincerely mourned by a host of friends. Sociable, affable, keen of humor, true in friendship, highly imaginative, charitable, and truly humble, he would have made an excellent divine, possessing many of those finer qualities of mind and heart so beautifully portrayed in Goldsmith's character in the "Deserted Village." No member of the profession had more friends, was better loved, or more sincerely mourned than Dr. Frank Sibley.

W. S. ROSE,
W. J. LEAKE,
B. C. NASH,
Committee.

Report of Delegate to National Convention.

May 1, 1914.

TO THE COUNCIL:

Gentlemen,—At the suggestion of our secretary I am presenting a report of my delegateship to the House of Delegates of the National Dental Association.

In order that you may comprehend the situation which confronted us at that time, I deem it wise to briefly recapitulate certain facts.

The reorganization of our National Association from the style of association which it has been in the past, with a membership of a few hundred, into a great representative National body, composed of state society units, which in turn should be composed of local or district units, and to effect this reorganization so that the rights of all individual members should be fairly safeguarded, was the task which confronted the Reorganization Committee, of which I had the honor to be a member.

The draft of the constitution presented was necessarily lengthy, and there were bound to be differences of opinion in regard to details. It was a source of gratification to the committee that the constitution as finally adopted was scarcely altered at all from the original, and such changes as were made very probably improved the instrument, even though they dealt with minor details.

But in the adoption of these alterations, during the Washington meeting, one error crept in. Certain new paragraphs were substituted for certain others which were eliminated. Now, it happened that those taken out had included a plan of procedure which would account for the transition period between the abandonment of the old constitution and the inauguration of the new constitution, an important provision which was not contained in the substituted paragraphs. Some hours after the formal adoption of the new constitution, this fact was discovered by the National secretary, Dr. Homer C. Brown, and a resolution was passed by the National Executive Council, which (quoting from memory) provided that the Kansas City meeting should be conducted as in the past, but that the new constitution should be inaugurated by a meeting of the First House of Delegates, which should elect new officers and committees, and adjourn. It was also provided that these same delegates should sit in the 1914 House of Delegates.

It was entirely within the right of the National Council to do this, and the plan was entirely feasible and just, if harmoniously put into effect. It would be wasting your time to present arguments on this. Suffice it to say that this resolution precipitated a factional contest which threatened to array one section of the country against the other, and it was to avert this that a joint meeting of

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the Executive Council and the Committee on Reorganization was held, at which the following resolution and plan of procedure was adopted, and eventually successfully put into effect:

RESOLVED, That in view of the apparent misunderstanding which exists relative to several matters in connection with the transition from the old to the new constitution, that it be the sense of this meeting that the following action be taken:

First. That the officers and Executive Council, elected at Washington, shall conduct this meeting as under the old constitution, except that the Council will report to the House of Delegates, after it is organized, instead of to the general body.

Second. That the House of Delegates for this session shall consist of one delegate representing each state society which has voted to affiliate with this association, and that none of such delegates shall hold over for 1914, unless re-elected by their respective societies.

Third. That such House shall hold its first meeting on Wednesday, July 9th, at 2.30 P.M. in the White room at the Baltimore Hotel.

Fourth. That the House of Delegates shall select the place of meeting and elect the general officers for the ensuing year; also a board of nine Trustees, all of whom shall serve for one year only, and shall transact all other business appertaining to the conduct of the affairs of this association, subsequent to this meeting.

Fifth. That the new constitution and by-laws shall be in full force as applied to the 1914 meeting.

Sixth. That all former members and new members who wish to be credited as members for the current year shall pay five dollars dues, as per statements already sent out by the treasurer, and that the payment of said dues shall cover membership up to January 1, 1914.

Seventh. That hereafter the fiscal year of this association shall agree with the calendar year, and dues of one dollar per member for the year 1914 shall be payable January 1, 1914.

Eighth. That all members of the state societies which have voted to affiliate with this association, who are not already members, shall be extended all privileges of membership at this meeting, without payment of dues, but will not be entitled to receive the bound volume of the transactions.

I call your attention to this set of resolutions at this time for several reasons.

First in relation to our delegates. The eight delegates elected last year were elected in pursuance of the Washington resolution; that is to say, they were elected to sit in the House of Delegates for a single session at Kansas City, and to act as our delegates at the 1914 meeting.

At Kansas City, however, it was agreed that each state should have but one delegate in the 1913 House of Delegates, and that none of the delegates should hold over to 1914 unless re-elected by their state societies.

It having thus been decided that only one delegate could sit for each state society, a caucus of our delegates was held, and after due deliberation it was voted that as I had been actively engaged in the reorganization of the National, through membership on the Committee on Reorganization, I should be chosen as the one delegate from our State Society, an honor which was much appreciated. It was further agreed, however, that in regard to nominations for offices in the National, the single delegate in the House should be guided by the caucus. There were two or three such caucus meetings, and names were canvassed for several offices, viz, the presidency of the National, the office of general secretary, and the board of trustees. In case it should develop that a contest should occur over the positions of president and secretary, the caucus suggested certain nominations from this state, and it was also the unanimous hope of the caucus that Dr. H. J. Burkhart might be elected to the board of trustees. At the final caucus, however, when it had been fairly well realized that there would be no contest over the chief offices, a resolution was unanimously passed to the effect that your delegate should go into the House of Delegates "uninstructed."

Your delegate, however, was credibly informed that a "slate" had been prepared in relation to the board of trustees. I do not deem it advisable to go into specific details at this time, when complete harmony prevails, but I think I may say that this slate did not contain the name of anyone from this state, and that unless circumvented, there was every chance that the "slate" would be elected.

Whilst acting as an uninstructed delegate,

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I could not forget that it was the unanimous wish of the caucus that Dr. H. J. Burkhart should be elected to the board of trustees. At the appropriate moment, therefore, I offered a resolution that each state which so desired should nominate one man to the board of trustees; that all these names should together constitute the ballot; and that each delegate should vote by making a cross against nine names.

This proved to be a most satisfactory method, and obviated the possibility of the nomination of a full board by any one section of the country. Your delegate is pleased also to report that our nominee, Dr. Burkhart, received the highest number of votes cast in this manner, and was subsequently made chairman of the board of trustees.

In regard to the second part of the resolution, to the effect that the delegates elected last year cannot sit in the House of Delegates in 1914 unless re-elected, this brings up a situation that must be determined by this Council. Under the Kansas City resolution none of last year's delegates can sit this year unless re-elected. On the other hand, these men were elected really to serve in 1914, and with the exception of myself none has enjoyed the honor. I would respectfully suggest, therefore, that at least in regard to those men who were deprived of their seats by the Kansas City agreement, this fact should be remembered when electing a new set of delegates.

This, however, brings up another vital point. The National has been reorganized on the so-called American Medical Association plan. This plan guarantees home rule, and equal representation and equal say in all sections. By it the state is supposed to select its representatives in the National, and the local is supposed to have the right also of expressing its wishes to the state body.

Last year, though not provided for in our state constitution, a precedent was set which is in agreement with this principle; viz, each district society caucus was asked to make a nomination for a delegate and an alternate. As I recall, one district made no nomination, so that it was simple to elect eight delegates, each of which represented not alone his state but his district.

This year the National meets in our own state, and it is probable, therefore, that each district society will nominate a delegate. Thus we shall have nine nominations, and only eight can be elected.

I would respectfully make the following suggestion: The National constitution requests that delegates should be chosen so that half the number shall be elected each year to serve for two years. I would suggest that we elect four delegates to serve in two houses of delegates—I do not say two *years* because there is to be no meeting in 1915—and four delegates to serve only in one house. Thereafter we can elect four delegates each year, to serve for two years. One point I would bring to your attention. There was a strong objection to one feature of the National constitution, but in spite of all objections the Reorganization Committee stood firm, and were unanimous in every vote to retain the principle. This principle is that locality as well as numerical strength should be represented in the House of Delegates. It is for this reason that the constitution provides that each state society, however large or small, shall first be allotted one delegate, and that additional delegates should be apportioned on a basis of numerical strength. Thus mere numbers shall not dominate. But neither should it be forgotten that the unwritten law of this land tells us that "the majority shall rule," in recognition of which latter principle of government, the National constitution was made to provide that after the first delegate, all others should be apportioned according to number of members in the state organization.

Applying these principles to our own state, we should remember that we have district societies so large that if they were state societies they would be entitled to two or more delegates, and for this reason, if possible, these large districts should be granted at least one delegate at all elections. Unfortunately we have nine districts and are entitled to but eight delegates, and therefore some one district must be unrepresented by a delegate. In view of the fact that the National will meet in the upper half of this state, and that the three districts in that section will probably have a larger proportion of members present, it would seem that it would be generous on the part of the districts in that part

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of the state, if one of them would consent to make no nomination. This, however, is of course by no means obligatory.

I would recommend, however, that we should have an amendment to our constitution touching on this matter, and I would suggest that it be provided that each district be regularly authorized to make one annual nomination of a delegate and an alternate, until such time as we may be entitled to more than nine delegates. When we shall be entitled to ten or more delegates, I believe we would be following the principle of the National Constitution if we should grant the tenth delegate to the largest district society, the eleventh to the second largest, etc. But up to and including nine delegates, no district should have more than one, except when a district or districts shall fail to make a nomination of a man willing to attend, and attendance at meetings should be a requirement for such preferment.

I would furthermore call attention to the rule adopted regarding the fiscal year, as I do not believe that this is fully understood by the district societies. In my own district, the Second, I believe that dues for the National for the year 1914 have been collected twice, or at least there has been some confusion. Would it not be advisable to make the fiscal year for the state and local societies all agree?

Respectfully submitted,

R. OTTOLENGUI.

Report of Committee on Oral Hygiene.

TO THE COUNCIL:

Gentlemen,—In submitting the annual report of the Oral Hygiene Committee, I desire first of all to thank the members of the Executive Council for the support they have given us in allowing us to carry out our ideas, some of which necessitated the expenditure of a considerable amount of money. I only hope that what we have accomplished will meet with your approval.

I regret exceedingly that some of the work which we hoped to accomplish has not been completed, but it can be carried on by our successors, if they so desire.

We expected the state department of Health to furnish us with an acetylene stereopticon and sets of fifty slides for each district, but the removal of Dr. Eugene H. Porter from office has deprived us of these outfits, at least for the present. Our not having these outfits has been a great loss to the work, because most of the district societies in the state voted a sum of money to pay the expenses of their members into the rural districts and smaller towns to give lectures using this equipment.

At the meeting of our committee in Elmira last fall, it was decided to get out outline forms or headings for lectures for different types of audiences, but in talking with several prominent dentists, the sentiment seemed to be so strongly in favor of a complete lecture, or at least a complete syllabus containing all the material necessary for a lecture, that the chairman deemed it inadvisable to continue with the outline forms until after this meeting. It would seem that a complete lecture or syllabus would be better, because, by requesting that the lecturers adhere to the teachings given, all lectures could be censored to quite a degree.

It was the expectation of the chairman of this committee to make a complete Oral Hygiene survey of the state, but an enforced absence from office for over two months cut down the time so much that this work will have to be completed by our successors.

The work in Oral Hygiene during the last year by districts is as follows:

FIRST DISTRICT.

(Dr. Waldo H. Mork. Dr. Russell K. Bryer.)

Dr. Herbert L. Wheeler has given two lectures.

Mouths of 2000 school children examined by Dr. Waldo H. Mork assisted by Dr. Greenstein.

Arrangements have been inaugurated for lectures under the auspices of the board of Education; and clinics have been established in the department of Health.

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The following free dental dispensaries are in operation:

New York Dispensary, 137 Center st.
Beachonian Dispensary, 183 Ludlow st.
Good Samaritan Dispensary, corner Essex and Broome sts.
Good Samaritan Dispensary, Christopher st. and Waverly Place.
Northwestern Dispensary, 403 W. 36th st.
Newport College of Dentistry, 205 E. 23d st.
College of Dental and Oral Surgery, 302 E. 25th st.
Dental Clinic, by 53d st. school.
Children's Aid Society, 552 W. 53d st.
St. Bartholomew Clinic, 217 E. 42d st.
N. Y. Throat, Nose, and Lung Hospital, 229 E. 57th st.
Harlem Dispensary, 108 E. 128th st.

Also clinics attached to the following-named hospitals: Bellevue, Gouverneur, Harlem, and Fordham. All known as Bellevue and Allied Hospitals.

SECOND DISTRICT.

(Dr. A. H. Stevenson. Dr. W. H. Frazer.)

The Committee on Public Health and Education, of which Dr. A. H. Stevenson of our committee is chairman, presented a very interesting report to their society, showing that lectures are continually being given to training schools for nurses, mothers' clubs, branches of the Y. M. C. A., settlement houses, and school children; in the last-named case, however, the lectures are being discontinued, as the board of education are now teaching mouth hygiene, including the tooth-brush drill.

The motion-picture film which is owned by this society is being used, and is considered a popular and forceful educator. This film was purchased a year ago by the Second District Society for $150, and the rentals received from renting it to organizations outside the district have amounted to $135.

THIRD DISTRICT.

(Dr. M. J. Barrett. Dr. Morton Van Loan.)

Talks at the Y. M. C. A. in Albany by dentists. A dental clinic has been established in the City-hall, Albany.

FOURTH DISTRICT.

(Dr. A. S. Moore. Dr. L. A. Timerman.)

Dr. White lectured several times in the district.

Dr. Goler of Rochester lectured in Glens Falls, and a free dispensary will probably be formed in the near future.

In Schenectady the mouths of the school children are examined by the school nurses, and children with defective teeth are sent to their family dentist if they have one and can afford to pay. If not they are sent to the free dispensary, which is supported by the city with a paid operator for three mornings a week.

In Canajoharie the mouths of the school children have been examined by dentists.

The Publicity Committee of the Third and Fourth Districts contemplate getting out a set of editorials on Oral Hygiene, to be published in the papers in the districts.

FIFTH DISTRICT.

(Dr. Charles S. Fowler. Dr. G. H. Butler.)

Dr. White has lectured in several towns in the district.

In Syracuse Dr. White and Dr. Wheeler both gave lectures, and a free dental clinic was established which, after a year, had to be discontinued on account of lack of support. However, a few dentists are still giving free work for one hour each day.

SIXTH DISTRICT.

(Dr. H. D. Whitmarsh. Dr. C. M. Dunne.)

No report received from this district: however, they have had several lectures by Dr. White in the district and there are free dispensaries in Elmira.

SEVENTH DISTRICT.

(Dr. A. W. Smith. Dr. W. W. Belcher.)

The free dental dispensaries of the Rochester Dental Society are in operation, three of which are open all the time. These dispensaries are supported by money raised on subscription, and also by benefit performances gotten up by the society. Without a doubt this is the most popular charity in the city.

EIGHTH DISTRICT.

(Dr. J. W. Beach. Dr. R. E. Luther.)

The December meeting of the society was given over to the Oral Hygiene Committee, and a public meeting was arranged at the Hotel Statler, Buffalo. The speakers were Health Commissioner Goler and Superintendent of Schools West of Rochester. Dr. W. A.

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White of Phelps, N. Y., Health Commissioner Fronzak, Superintendent of Schools Emerson, and Hon. E. H. Butler of Buffalo. The meeting was largely attended, the audience being made up of health officers and superintendents of schools from the various cities and towns throughout the district, and others interested in the work.

To follow up the work of this meeting, the president of the society appointed a committee composed of Drs. Abram Hoffman, chairman; M. B. Eshleman, secretary; J. W. Beach; Frank L. Dayment, and D. H. Squire. This committee, with the able assistance of the late Hon. E. H. Butler, editor of the *Buffalo News*, and Health Commissioner Fronzak, secured an appropriation of nearly $8000 for the first year for the establishment and maintenance of free dispensaries. One clinic has been in operation in the infirmary of the Dental Department of the University of Buffalo since the latter part of February, and two others are about ready to begin operation. To carry on the work in Buffalo, two inspectors, two operators, and two women assistants have been appointed.

The Tuberculosis Hospital on Swan st., Buffalo, has a dispensary with a paid assistant. There is also a dispensary which is attended to by voluntary service in the Fitch Crèche, Swan st.

The Buffalo Orphan Asylum has a well-equipped clinic, and the operators, members of the Eighth District Society, give their service. The clinic is in operation one-half day each week.

The Oral Hygiene work throughout the district outside of Buffalo has been very active. Dr. White has lectured in most of the important towns in the district.

In Olean the city council has passed a resolution providing for a sufficient amount of money to maintain a free clinic in that city.

In Fredonia Dr. A. H. Hollister has given lectures in the schools.

In Lockport Dr. W. J. Leake has given talks to the physicians of the city.

In Batavia a rather systematic course has been followed out. Last May, in connection with "health week," Dr. White lectured to all the school children in both public and parochial schools. He also lectured to the pupils and teachers at the New York State School for the Blind and the training school in the city hospital. In the evening he gave a public lecture in the theater, lecturing in all ten times, to over 3000 people. In September this was followed with a dental exhibit at the county fair, being a part of the joint health exhibit of the state department of Health and the Batavia Health department. Following this, the Batavia Dental Society offered to equip and maintain a dispensary for the poor school children. This dispensary is about ready to begin operation.

Ninth District.

(Dr. G. A. Hammond. Dr. H. L. Barnum.)

The Educational Committee has been discontinued, and the Oral Hygiene Committee is to do the work formerly done by that committee.

The Hudson River Schoolmasters' Council has expressed the desire to co-operate with any educational work the society may suggest.

The following stickers have been used by the members of the society.

[Here followed specimens of nine stickers.]

Some free dental work has been done by dentists in Ossining.

A free dispensary is to be opened in Poughkeepsie in the fall. Dr. White has lectured in Poughkeepsie, Tarrytown, and Vassar College, and Dr. Wolff, the newly-appointed lecturer, of New York, has lectured in Poughkeepsie.

Probably the most important work undertaken by the committee has been the motion-picture film, a scenario of which was mailed to each member of the Executive Council, and is appended to this report.

At Elmira last November, our committee was voted $100 to do some preliminary work on the film. I hope you will feel that it has been money well spent, and allow us to continue with the work and produce the film. We feel that in no way can we reach the people to educate them as with a motion-picture film. We desire to have the film completed by July 1st, so that it may be shown at the meeting of the National Dental Association. We believe that the revenue from the sale and rental of films will provide the committee with funds sufficient to carry on

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a work which will be of the greatest benefit, not only to the people and the society, but to the profession.

I would respectfully ask that the Council take action allowing the Oral Hygiene Committee to keep for the use of that committee in carrying on and enlarging its work the net money realized from the sale and rental of the films.

As will be seen by this report, in spite of the lack of a complete report from some of the districts, much interest is being taken in all forms of educational work; and that the people are responding to the instruction is shown by the fact that in many places dispensaries are being carried on by money raised by taxation.

The work done by Dr. White cannot be spoken of in too high terms, and he deserves the warmest support. Since January 1, 1913, Dr. White has lectured 200 times, to about 78,000 people. I wish to ask each member of the Executive Council to make it a point to see that good, live, interested men are appointed as members of the Oral Hygiene Committee from their respective districts. Do not hold out the inducement that there is nothing to do, because there is much to be done, and it can only be accomplished by good men who are willing to work.

Among the things desirable to accomplish is the arranging of an oral hygiene exhibit demonstrating the ways of carrying on education and the forming of free clinics, this exhibit to be at each dental meeting in the state.

I would recommend to next year's Oral Hygiene Committee (1) that an oral hygiene survey of the state be made; (2) that complete lectures or very comprehensive syllabi be arranged, to be used in lecturing to various types of audiences; (3) that every effort be made to induce the state Health department to provide our committee with the acetylene stereopticon and slides; (4) that a systematic scheme of education be devised with the view of establishing free clinics.

In closing I desire to thank the members of this committee for the cordial support they have given me.

Respectfully submitted,

R. E. LUTHER, *Chairman.*

An Inquiry from the First District.

NEW YORK, May 12, 1914.

TO THE COUNCIL:

Gentlemen,—The board of directors of the First District Dental Society, at a recent meeting requested me to call your attention to a situation in Greater New York connected with the requirements for membership which causes some embarrassment to both the First and Second District Societies.

Section 2, Article II, of the Second District by-laws states: "Active members shall be practitioners of dentistry in this district at the time of their election."

Section 2, Article III, of the by-laws of the First District Society states: "Active members shall be reputable and ethical dentists practicing in the First Judicial District of the State of New York."

Section 4 of the by-laws of the Dental Society of the State of New York states, in part: "The active membership shall consist of all dentists who are members of the several district societies of the state in good standing on the 25th day of April of each year; and as provided in Section 39 of the by-laws, they must be members [active?] of the society in the district in which they practice."

The lack of agreement between the by-laws of these societies, as above quoted, complicated as the situation is by an associate membership class in the First District Society and by occasional removals from one district to another, makes a ruling by your honorable body on the questions involved exceedingly desirable at this time.

(1) May a dentist be an active member of more than one district society at the same time?

(2) If a practitioner of Brooklyn, a member in good standing of the Second District Society, transfers his practice to the borough of Manhattan, may he retain his active membership in the Second District Society, or must he be transferred to the First district in order to be in good standing in the State Society?

Requesting you to favor me with your official opinion regarding these questions of so much importance, I am

Yours fraternally,

S. E. DAVENPORT,
President First District.

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REPORTS FROM THE DISTRICT SOCIETIES.

First District.

THE annual meeting of the First District Dental Society of the State of New York was held on April 6, 1914, and the following persons were elected officers for the ensuing year:

President—Sebert E. Davenport.
Vice-president—W. D. Tracy.
Recording Secretary—Leland Barrett.
Corresponding Secretary—J. Russell Watson.
Treasurer—Bissell B. Palmer, Jr.
Editor—Frederick C. Kemple.
Chairman of Sections—Chas. F. Ash.
Librarian—O. J. Chase, Jr.
Curator—W. T. Van Winkle.
Executive Committee—Karl C. Smith, Herbert L. Wheeler, S. W. Van Saun (chairman).
State Dental Examiner (term to expire 1917)—Wm. C. Deane.
Members of Executive Council—Herbert L. Wheeler (regular), and Wilber M. Dailey (alternate).

The following were elected to serve on State Society committees: Wm. Carr (Law); M. C. Tracy (Legislative); Waldo H. Mork and Russell K. Bryer (Oral Hygiene).

Delegates to the National Dental Association: W. W. Walker; H. W. Gillett (alternate).

During the season the regularly scheduled meetings were held—six for scientific work, the annual meeting in April, and two special meetings to consider recommendations to the State Law Committee. An innovation was successfully tried—that is, preceding the regular meetings, clinics were held at 5 P.M., and an informal dinner at 6.30—all in the interest of better dentistry and closer acquaintance among our members.

During the year, owing to the deaths of Drs. J. N. Farrar, C. A. Meeker, J. H. Frees, G. H. Rich, C. A. Dubois, H. Philipps, and H. H. Sisson, the resignation of several, the dropping of others not in good standing, and the addition of about 50 new members, our roll now stands at 424 active, 185 associate, and 54 honorary members, making a total of 663 members.

Respectfully submitted,
LELAND BARRETT, *Rec. Sec'y.*

ACTIVE MEMBERS.

Abel, L. Hosford, 40 E. 41st st.
Adams, Irving F., 160 W. 106th st.
Addelston, W. M., 73 E. 92d st.
Agostini, E. M., 97 Central Park West.
Andrade, Alex., 123 W. 95th st.
Andrews, Chas. L., 39 W. 105th st.
Arkin, David M., 100 W. 87th st.
Armstrong, Herbert R., 200 W. 72d st.
Aronson, Geo. G., 507 Fifth ave.
Aronstein, Wm., 100 W. 117th st.
Asch, Andrew J., 331 Madison ave.
Asch, Jacob, 300 Central Park West.
Ash, Chas. F., 115 Broadway.
Babcock, Ralph W., 268 Madison ave.
Baker, David C., 516 Fifth ave.
Baker, Edward W., 119 W. 121st st.
Baldwin, Harold L., 40 E. 41st st.
Baldwin, L. C., 167 W. 71st st.
Ballin, Irving J., 164 E. 72d st.
Bark, Arthur W., 779 Madison ave.
Barker, Clinton Reed, 57 W. 50th st.
Barnard, Wm. E., 40 E. 41st st.
Barrett, Leland, 215 W. 116th st.
Bate, Jacob, 758 West End ave.
Bendernagel, James F., 451 West End ave.
Benney, Walter, 352 W. 23d st.
Berger, Adolph, 158 E. 79th st.
Berlin, Simon, 1800 Seventh ave.

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Betzig, Edward P., 417 E. 143d st.
Beyer, Fritz A., 168 E. 38th st.
Birkhahn, Alex. M., 302 Central Park West.
Bishop, Edward A., 386 Audubon ave.
Blakeslee, Geo. W., 157 W. 93d st.
Bleyer, LeRoy M., 836 Lexintgon ave.
Blum, Richard, 576 Fifth ave.
Blum, Theodore, 576 Fifth ave.
Bogue, Edward A., 63 W. 48th st.
Bogue, Fred L., 63 W. 48th st.
Bourne, A. R., 174 W. 79th st.
Bowman, Harry, 108 E. 73d st.
Brandt, Henry, 200 W. 113th st.
Brash, W. W., 1554 Broadway.
Brazill, Manuel J., 2090 Seventh ave.
Breen, John M., 115 E. 17th st.
Brophy, Chas. J., 3456 Broadway.
Brown, Irving W., 171 W. 71st st.
Brown, M. Hart, 1511 E. Chester road.
Browne, Chas. L., 200 W. 57th st.
Brush, F. C., 1181 Broadway.
Bryer, Russell K., 515 Madison ave.
Buckley, John T., 272 Willis ave.
Bunker, Jane G., 184 Joralemon st., Brooklyn.
Burke, J. Willard, 246 Fifth ave.
Burns, Bert A., 51 E. 42d st.
Burt, John D., 40 E. 41st st.
Burton, I. G., 1183 Broadway.
Butler, E. Santley, 576 Fifth ave.
Buxbaum, A. I. F., 331 Madison ave.
Byers, J. M., 303 Fifth ave.
Caddick, George H., 17 E. 38th st.
Campbell, Guy, 253 Columbus ave.
Carleton, S. S., 171 W. 71st st.
Carman, Herman F., 343 E. 142d st.
Carney, Matthew F., 51 E. 42d st.
Carr, Wm., 560 Fifth ave.
Carrabine, Oscar, 542 Fifth ave.
Chaim, Morris L., 1 W. 85th st.
Chase, O. J., Jr., 17 E. 38th st.
Chayes, Herman E. S., 576 Fifth ave.
Chicherio, F. A., 235 W. 129th st.
Clayton, Walter H., 20 E. 126th st.
Cloud, Agnes D., 449 W. 23d st.
Cohen, Bernhard, 315 Fifth ave.
Colburn, M. L., 600 W. 157th st.
Colburn, Walter H., 176 W. 72d st.
Colding, Henry S., 251 W. 92d st.
Cole, C. Monford, 106 E. 57th st.
Cole, J. P., Dobbs Ferry.
Collins, Martin L., 2001 Fifth ave.
Concklin, Edward F., 44 E. 64th st.
Converse, J. S., 42 W. 40th st.
Cotton, Waite A., 3750 Broadway.
Cowles, Ward H., 1993 Boston road.
Crookshank, F. A., 849 E. 156th st.
Cudlipp, Edwin, 167 W. 71st st.
Currie, Alex. W., 40 E. 41st st.
Dailey, Wilber M., 19 E. 69th st.
Dailey, Washington, 667 Madison ave.
Danforth, A. G., 55 W. 39th st.
Davenport, R. M., 51 W. 47th st.
Davenport, Sebert E., 51 W. 47th st.
Davenport, Sebert E., Jr., 51 W. 47th st.
Deane, Harry T., 616 Madison ave.
Deane, Wm. C., 616 Madison ave.
Degenhardt, M., 230 W. 97th st.
Delaney, John T., 1378 Lexington ave.
De Sola, S., 333 Central Park West.
De Wolfe, Edward R., 1730 Broadway.
Dickinson, J. W., 542 Fifth ave.
Dills, Wm. B., 140 W. 57th st.
Dixon, Edwin H., 40 E. 41st st.
Doxtater, L. W., 675 Madison ave.
Draper, Wm. H., 11 E. 48th st.
Dunning, Henry S., 17 E. 38th st.
Dunning, Wm. B., 140 W. 57th st.
Durschang, A. C., 321 E. 17th st.
Easton, B. A., 66 Market st., Poughkeepsie.
Eddy, G. M., 532 Fifth ave.
Elster, Robert E., 201 W. 108th st.
Emerson, C. H., 167 W. 71st st.
Erganian, J. K., 175 Fifth ave.
Ernst, Otto, Larchmont.
Evans, Harry P., 44 E. 64th st.
Evans, George, 55 W. 39th st.
Ferris, Henry C., 140 W. 57th st.
Fischer, Edward W., 202 W. 74th st.
Fisher, Wm. C., 373 Fifth ave.
Fletcher, C. R., 167 W. 71st st.
Force, Willard B., 576 Fifth ave.
Fossume, Finn S., 616 Madison ave.
Fox, Edward, 252 W. 79th st.
Francis, W. E., 47 W. 34th st.
Franken, Sigmund W., 36 E. 40th st.
Freedman, Anna G., 275 Central Park West.
Fulton, John G., 116 W. 59th st.
Gardner, Boyd S., Aeolian Hall.
Gardner, Walter H., 1271 Broadway.
Gates, Albert W., 606 West 116th st.
Gentle, Robt. B., 18 E. 41st st.
Getz, Forry R., 576 Fifth ave.
Getzoff, Samuel M., 27 E. 81st st.
Gibbs, John R., Jr., 149 Broadway.
Gibson, Kasson C., 115 W. 77th st.
Gies, Carl J., 315 E. 86th st.
Gillett, Henry W., 140 W. 57th st.
Gluck, Ernest, 152 E. 111th st.

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Goldberg, Harry A., 222 E. 72d st.
Goode, Gladstone, 576 Fifth ave.
Gottschaldt, Martin C., 40 E. 41st st.
Grace, Thomas M., 167 W. 71st st.
Green, Leo, 44 E. 75th st.
Greenbaum, Leo, 741 Fifth ave.
Greminger, Albert N., 331 Madison ave.
Griffin, Francis D., 164 W. 73d st.
Gross, Samuel, 371 E. 198th st.
Gudewill, R. H. E., 30 W. 59th st.
Gunn, Andrew H., 40 E. 41st st.
Haas, Arthur, 911 Park ave.
Haigh, Herbert, 329 Amsterdam ave.
Hammer, H. F., 69 E. 55th st.
Hargett, Arthur V., 2016 7th ave.
Hartman, Wm. N., 167 W. 71st st.
Harvitt, Joseph, 214 E. Broadway.
Hasbrouck, Jas. F., 40 E. 41st st.
Hasbrouck, J. Roswell, 171 W. 71st st.
Hassell, Samuel W., 118 W. 71st st.
Hassinger, J., 435 W. 146th st.
Heckard, Wm. A., 489 Fifth ave.
Heinzer, Edward A., Amsterdam ave. and 99th st.
Heller, Chas. A., 171 E. 116th st.
Hellman, Milo, 40 E. 41st st.
Herbert, Wm. C., 576 Fifth ave.
Herbst, Max, 4 New Chambers st.
Hermans, James, 167 W. 71st st.
Herzog, James R., 54 E. 93d st.
Hess, Samuel, 818 Lexington ave.
Higgins, John H., 43 E. 25th st.
Hill, D. A., 1295 Fulton ave.
Hills, Wm. B., 307 E. 18th st.
Hlavac, Chas. W., 240 E. 69th st.
Hoag, Wm. J., 527 Fifth ave.
Hobby, G. W., 167 W. 71st st.
Hoblitzell, C. M., 431 Convent ave.
Holdridge, P. A., 126 W. 127th st.
Houston, H. C., 69 Sixth ave.
Howe, Frank Morgan, 113 E. 60th st.
Howe, John Morgan, 576 Fifth ave.
Howells, Edwards W., 107 W. 48th st.
Hull, Geo. A., 123 W. 73d st.
Hull, Henry J., 40 E. 41st st.
Hussa, Philip, 40 E. 41st st.
Hutchinson, R. G., Jr., 11 E. 48th st.
Hyland, J. D., 255 W. 44th st.
Igel, Victor, 2127 Hughes ave.
Ireland, Alice J., 44 W. 47th st.
Irving, Wm. W., 40 E. 41st st.
Jackson, Victor H., 40 E. 41st st.
Jenkins, G. R., 40 E. 41st st.
Jernigan, Geo. F., 61 W. 56th st.
Jones, Lawrence H., 2 Wall st.
Kaplan, Emanuel M., 136 Liberty st.
Karmiohl, Jacob, 340 E. 72d st.
Kauffer, H. J., 112 W. 72d st.
Keith, Ross H., 1161 Broadway.
Kelly, O. R., 200 W. 72d st.
Kelsey, Ernest A., 2001 Fifth ave.
Kemple, Frederick C., 576 Fifth ave.
Kempton, J. F., 69 W. 130th st.
Kennard, Louis W., 542 Fifth ave.
Kennedy, Clement D., 119 E. 60th st.
Kimball, C. Denny, 40 E. 41st st.
Kimball, Chas. Otis, 40 E. 41st st.
Knecht, Wm. D., 40 E. 41st st.
Kreisler, David, 95 W. 119th st.
Krows, Earl, 126 W. 126th st.
Lambert, H., 122 E. 74th st.
Lang, Joseph, 66 E. 58th st.
La Roche, Montgomery, 704 Madison ave.
Lederer, Wm. J., 150 E. 74th st.
Leggett, Geo. H., 133 W. 123d st.
Lekowski, Victor, 207 E. 15th st.
LeRoy, Louis C., 38 W. 50th st.
Lester, Wm. B., Park Row Building.
Levy, Joseph M., 1277 Madison ave.
Liebrecht, Chas. F., 203 W. 81st st.
Lindsay, Elmer A., 36 E. 40th st.
Lindsay, Harley B., 40 E. 41st st.
Linton, Chas. C., 40 E. 41st st.
Litten, Arthur S., 238 W. 78th st.
Locherty, Jas. B., 109 W. 45th st.
Loomis, H. J., 20 W. 47th st.
Lowenstein, Julius, 971 Second ave.
Lowenstein, M. S., 2 W. 94th st.
Ludington, Robert B., 40 E. 41st st.
Lyke, J. Hyatt, 242 Lenox ave.
McCormick, Herbert V., 26 Cortlandt st.
McGrath, S. W., 321 E. 17th st.
McKenzie, James, Jr., 57 W. 84th st.
McLaren, Francis J., 127 W. 48th st.
McNaughton, Stuart A., 63 W. 49th st.
McNeille, Chas. S., 500 Fifth ave.
McNeille, Percy R., 500 Fifth ave.
Macdonald, Wm. D., 576 Fifth ave.
Madsen, M. P., 201 W. 94th st.
Mann, Joseph, 317 Second ave.
Manney, G. A., 101 E. 92d st.
Manville, Geo. P., 576 Fifth ave.
Marco, B. Barrymore, Hotel Ansonia.
Marshall, H. G., 144 W. 126th st.
Mattes, Otto, 241 W. 14th st.
Matteson, George E., 150 W. 104th st.
Mayer, Joseph H., 124 E. 92d st.
Meeker, John B., 253 W. 85th st.

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Mehlig, Carl F. C., 527 Fifth ave.
Merritt, Arthur H., 59 W. 46th st.
Metzger, Otto I., 44 W. 95th st.
Meyer, John H., 161 W. 71st st.
Miller, Alonzo B., 542 Fifth ave.
Miller, Arthur, 2880 Broadway.
Minner, Edmund E., 144 W. 92d st.
Mishnun, Harry, 601 W. 137th st.
Mitchell, Vethake E., 23 W. 36th st.
Mobley, Lewis K., 46 W. 51st st.
Moolten, Raphael J., 13 Astor Place.
Mork, Waldo H., 2091 Washington ave.
Morse, Daniel E., 1068 Lexington ave.
Moss, Michael L., 307 E. 86th st.
Nash, Benj. C., 143 W. 81st st.
Nash, Louis, 17 E. 38th st.
Newgarden, Charles, 564 W. 160th st.
Niles, F. B., 2139 Seventh ave.
Noll, Joseph A., 501 W. 138th st.
Northrop, H. W., 546 Fifth ave.
O'Brian, L. A., 542 Fifth ave.
Ogden, Harry B., 130 W. 57th st.
Onderdonk, Thos., 542 Fifth ave.
Ottolengui, R., 80 W. 40th st.
Ováry, Francis, 321 E. 68th st.
Palmer, Bissell B., 220 W. 98th st.
Palmer, Bissell B., Jr., 40 E. 41st st.
Palmer, Corydon, 231 W. 97th st.
Palmer, Delos, 48 W. 50th st.
Palmer, Geo. B., 40 E. 41st st.
Palmer, Leslie E., 140 W. 57th st.
Parker, Horace J., 40 E. 41st st.
Paulsen, A. F., 441 Tremont ave.
Paulsen, M. A., 2041 Fifth ave.
Pease, J. Grant, 61 W. 74th st.
Peeso, Fred A., 542 Fifth ave.
Perez, José G., 315 Fifth ave.
Perkins, Bertram R., 40 E. 41st st.
Peters, August L., 125 E. 64th st.
Peters, Henry H., 260 W. 72d st.
Peters, John L., 133 W. 72d st.
Phillips, Henry H., 1722 Aeolian Hall.
Polhamus, Agnes I., 98 Morningside ave.
Prentiss, Elias B., 130 W. 57th st.
Price, Sherman B., 515 Madison ave.
Quendenfeldt, Paul B. H., 570 Bergen ave.
Rabell, Chas. Francis, 40 E. 41st st.
Rachliss, Nathan H., 314 Kirby ave., W. Detroit, Mich.
Randolph, W. F., 1328 Broadway.
Ranhofer, Edward J., 65 W. 70th st.
Rathfelder, G. C., 300 W. 107th st.
Raymond, E. H., Jr., 542 Fifth ave.
Reed, J. Howard, 120 W. 87th st.
Refsum, Joseph, 715 Madison ave.
Reitz, Ralph B., 576 Fifth ave.
Remington, Frank A., 57 W. 49th st.
Requa, J. Eugene, 616 Madison ave.
Rettich, Hugo, 52 W. 68th st.
Rhein, M. L., 38 E. 61st st.
Rice, Geo. E., 24 E. 48th st.
Richardson, C. C., 292 W. 92d st.
Riggs, Wm. D., 24 E. 48th st.
Rivinius, Julius W., 173 W. 73d st.
Robinson, Edwin S., 28 W. 39th st.
Roche, Thos. H., Broadway and 98th st.
Root, John C., 24 E. 48th st.
Ros, Osvaldo, 452 Fifth ave.
Rosalsky, Harry W., 100 W. 115th st.
Rosenbaum, Wm., 124 W. 114th st.
Rosenstiel, L. S., 76 Garven ave., Asbury Park, N. J.
Rothkranz, Wm. C., 45 W. 34th st.
Rouse, Arthur G., 576 Fifth ave.
Roy, Frank Austin, 527 Fifth ave.
Roy, Harold E., 527 Fifth ave.
Rubricius, Frank I., 217 E. 72d st.
Rubsam, Chas. W., 140 W. 57st st.
Ruyl, J. P., 40 E. 41st st.
Salsbury, Henry L., 113 W. 85th st.
Sanford, Edward A., 27 W. 42d st.
Schamberg, Morris I., 116 W. 59th st.
Schiff, Wm. G., 231 W. 125th st.
Schnaper, Samuel, 860 Lexington ave.
Schwamm, Henry, 174 E. 74th st.
Schwarz, Frederick J., 261 W. 21st st.
Scobey, Harry C., 116 W. 59th st.
Scott, Charles F., 17 E. 38th st.
Senior, Eugene, 333 Central Park West.
Shaw, Geo. M., 40 E. 41st st.
Sheckter, Samuel J., 1849 Madison ave.
Sherry, Ernest, 301 W. 109th st.
Shields, Nelson T., 61 W. 56th st.
Short, Wm. B., 176 W. 72d st.
Simon, Samuel, 794 Lexington ave.
Sinnigen, Walter C., 560 Fifth ave.
Skalmer, M., 124 E. 95th st.
Skidmore, J. L., 250 W. 74th st.
Smith, Edward C., 23 W. 36th st.
Smith, Fred E., 66 W. 49th st.
Smith, F. Milton, 63 W. 48th st.
Smith, Karl C., 576 Fifth ave.
Solow, L. J., 1239 Madison ave.
Spencer, H. W., 437 Fifth ave.
Spengeman, Percy G., 400 W. 152d st.
Stack, Wm. H., 488 Tremont ave.
Stanley, Rolof B., 11 E. 48th st.
Stanton, Fred'k L., 28 W. 39th st.

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Stark, A. Burton, 505 Fifth ave.
Starr, Alfred Russell, 10 E. 92d st.
Steeves, S. A., 33 W. 42d st.
Stein, Gustave R., 144 W. 123d st.
Stern, Henry G., 3671 Broadway.
Stern, Leo, 924 West End ave.
Stewart, Howard T., 51 E. 42d st.
Stier, Julius J., 226 W. 78th st.
Stoney, Arthur C., 515 Madison ave.
Strance, A. G., 315 Central Park West.
Strauss, Milton A., 2412 Seventh ave.
Strohmeyer, Joseph J., 167 W. 71st st.
Strong, Irving E., 1059 Tinton ave.
Sutherland, Arnold H., 28 W. 39th st.
Sweeney, Thos. F., 973 Lexington ave.
Sweetser, R. W., 18 W. 34th st.
Swift, Arthur L., 140 W. 57th st.
Swift, Thomas, 1 Park ave., Mt. Vernon, N. Y.
Sylla, E. W., 1271 Broadway.
Taylor, C. S., 102 W. 93d st.
Taylor, Herbert W., 58 W. 50th st.
Taylor, J. Ostram, 592 E. 165th st.
Taylor, James W., 106 E. 57th st.
Terrell, Geo. B., 40 E. 41st st.
Terry, Winfield C., 140 E. 92d st.
Thompson, Daniel B., 214 W. 71st st.
Throop, Harold M., 140 E. 92d st.
Tomlinson, Edward S., 40 E. 41st st.
Tooley, Francis L., 157 E. 79th st.
Tousey, Sinclair, 140 W. 57th st.
Tracy, Martin C., 46 W. 51st st.
Tracy, Wm. Dwight, 46 W. 51st st.
Trattner, Henry, 171 E. 81st st.
Turcot, F. G., 546 Fifth ave.
Turner, Frederick C., 505 Fifth ave.
Turner, W. J., 19 W. 54th st.
Tyrrell, Wm. Bell, 521 W. 111th st.
Van Horne, Herman E., 47 W. 34th st.
Van Saun, S. W., 250 W. 74th st.
Van Winkle, W. T., 59 W. 46th st.
Vaughan, Harold T., 616 Madison ave.
Vaughan, Ray G., 11 E. 48th st.
Vetter, Charles, 2 W. 88th st.
Vuilleumier, J. A., 58 E. 58th st.
Waddell, R. W., 45 W. 34th st.
Walker, Alfred S., 295 Central Park West.
Walker, Wm. Wallace, 58 W. 50th st.
Walther, Arno W., 231 W. 97th st.
Wardwell, Claison S., 576 Fifth ave.
Watson, John Russell, 576 Fifth ave.
Webster, William Lloyd, 101 W. 78th st.
Weed, Thos. M., 464 W. 145th st.
Wehrenberg, W. D., 2131 Broadway.
Weinberger, B. W., 40 E. 41st st.
Weld, Geo. W., 16 E. 23d st.
Westbay, Henry E., 219 W. 71st st.
Wheeler, C. W. B., 17 E. 38th st.
Wheeler, Herbert L., 560 Fifth ave.
Wheeler, Isaiah N., 60 W. 51st st.
White, John E., 1328 Broadway.
White, W. D., Jr., 331 Madison ave.
Whitlock, W. Melvin, 11 E. 48th st.
Whitney, Edward P., 54 W. 48th st.
Willcox, Harry, 516 Fifth ave.
Willis, Geo. P., 949 Lexington ave.
Wilson, Geo. A., 542 Fifth ave.
Wilson, Geo. A., Jr., 516 Fifth ave.
Wilson, Lawton H., 576 Fifth ave.
Wolff, Alexander, 141 E. 34th st.
Wollison, R. M., 576 Fifth ave.
Wright, Chas. D., 57 W. 50th st.
Young, J. Lowe, 576 Fifth ave.
Zentler, Arthur, 527 Fifth ave.
Zimmerman, G. H., 167 W. 93d st.
Zweig, Jacob, 115 W. 119th st.

Second District.

THE annual meeting of the Second District Dental Society of the State of New York was held April 13, 1914, and the following persons were elected officers for the ensuing year:

President—A. H. Stevenson.
Vice-president—E. A. Holbrook.
Recording Secretary—F. O. Kraemer, Jr.
Corresponding Secretary—W. S. Watson.
Treasurer—C. M. Norcom.
Librarian—T. A. Quinlan.
State Dental Examiner—F. C. Walker.
Members of Executive Council—H. P. Gould (regular), W. N. Frazer (alternate).

The following were elected to serve on State Society Committees: R. Ottolengui (Law); F. O. Kraemer (Legislative); T. P. Hyatt and W. N. Frazer (Oral Hygiene).

Respectfully submitted,

F. O. KRAEMER, JR., *Rec. Sec'y.*

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ACTIVE MEMBERS.

(Resident in Brooklyn unless otherwise specified.)

Allen, C. C., 138 Clinton st.
Allen, N. H., 444 Franklin ave.
Allyn, F. L., Woodhaven, L. I.
Arvine, F. B., 793 Lincoln Place.
Ayers, Herbert D., 93 Amity st., Flushing, L. I.
Babcock, E. H., 184 Joralemon st.
Babcock, L. H., 2118 Beverly road.
Bade, Henry, 136 Halsey st.
Barker, D. W., 87 Lafayette ave.
Barnes, F. D., 178 Stuyvesant ave.
Bauer, August F., 154 Nassau st., N. Y. C.
Beissel, W. J., 1004 Broadway.
Berendsohn, E. H., 204 Berkeley Place.
Berendsohn, W. A., 598 Carlton ave.
Bishop, C. G., 127 Halsey st.
Bornman, Carl F., 324 Stuyvesant ave.
Boudin, Anna P., 477 E. 16th st.
Bower, T. B., 450 Grand ave.
Boylhart, Fred'k H., 129 St. Felix st.
Brown, Byron, 77 Hanson Place.
Brown, J. B., 80 Lafayette ave.
Buchenholz, Ira, 258 Hart st.
Buckley, W. A., Liberty, N. Y.
Burgess, F. L., Huntington, L. I.
Bush, C. A., 126 Hancock st.
Bush, W. N., 183 Halsey st.
Campbell, D. K., 436 Gold st.
Carpenter, Walter Titus, 191 Ryerson st.
Cary, W. B., 23 Flatbush ave.
Childs, H. M., 110 S. Elliott Place.
Clark, Robert H., 350 Carlton ave.
Clark, W. G., 103 Montague st.
Clark, W. P., 26 Seventh ave.
Clasing, J. F. W., 283 President st.
Clayton, Furman, 469 Franklin ave.
Coe, Thomas C., 508 E. 5th st.
Cook, Frank W., 44 Court st.
Croscup, H. C., 327 Sterling Place.
Crossman, Victor W., 136 Fort Greene Place.
Cuinet, L. A., 152 Henry st.
Davis, George E., 1612 Broadway.
Dayton, C. R., 488 Nostrand ave.
Deale, W. H., Babylon, L. I.
De Bar, William, 258 Ovington ave.
Desnoes, A. M., 488 Nostrand ave.
Dills, W. B., 140 W. 57th st., N. Y. C.
Douglass, G. C., 877 Greene ave.
Easley, Shirley H., 977 Jefferson ave.
Edwards, LeRoy S., 113 S. Elliott Place.
Engel, P. B., 10 Stuyvesant ave.
Engel, W. F., 10 Stuyvesant ave.
Ewald, Martha R., 1211 ave. N.
Farmer, G. P., 452 Nostrand ave.
Ferris, H. C., 67 Hanson Place.
Filler, Julius, 68 McKibben st.
Filler, Samuel H., 353-a Vernon ave.
Finney, J. H., 333 McDonough st.
Fischler, Bernard, 120 Reid ave.
Fuchs, W. J., 34 Jefferson ave.
Fuller, D. A., 184 Joralemon st.
Fuller, Z. P., 110 S. Elliott Place.
Gardner, G. Wilbur, 184 Joralemon st.
Gelson, J. Norbert, 282 Park Place.
Gilcrest, H. C., Nyack, N. Y.
Gilman, R. E., 33 Lafayette ave.
Glenzer, J. A., 593 Hancock st.
Glover, B. W., 34 Clarkson st.
Gomer, Charles A., 770 Willoughby ave.
Gough, F. A., 184 Joralemon st.
Gould, Horace P., 181 Joralemon st.
Green, H. C., 228 Cumberland st.
Griesmer, M. F., 364 McDonough st.
Gunton, Leonard M., 1 Sidney Place.
Haas, H., 240 Covert st.
Haley, J. F., 840 Herkimer st.
Halsey, W. E., 203 Jefferson ave.
Hamlet, F. P., Hempstead, L. I.
Hankinson, M. C., 201 Schermerhorn st.
Hanning, J. H., 1085 E. 18th st.
Harby, R. D., 792 Lincoln place.
Heath, Henry, Jr., 64 Hancock st.
Held, John W., 826 Rogers ave.
Helig, S. E., 232 Flatbush ave.
Herman, Leo, 4721 12th ave.
Hesse, Carl G., 1159 Broadway.
Hillyer, Ellison, 1143 Dean st.
Hock, B. L., 130 Reid ave.
Holbrook, E. A., 148 Hancock st.
Holmbee, Birger, 86 Prospect Place.
Holmes, J. H., 107-a Halsey st.
Hopkins, S. P., 184 Joralemon st.
Hunter, Arthur M., 67 Hanson Place.
Husch, Jacob, 269½ Vernon ave.
Huskinson, Ernest C., 1246 Pacific st.
Hyatt, T. P., 17 E. 38th st., N. Y. C.
Jarvie, Wm., 19 W. 54th st., N. Y. C.
Joffe, Maxwell S., 72 Manhattan ave.
Johnson, A. S., 621 St. Marks ave.
Johnson, G. B., 220 Bergen st.

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Johnston, W. H., 35 Ft. Greene Place.
Kaletsky, C. Myron, 297 Fulton st., Jamaica, L. I.
Keowen, S. S., 24 New York ave.
Keppy, F. B., 62 Hancock st.
Ketcham, F. S., 141 Hancock st.
King, Henry A., 446-a Hancock st.
King, Horace W., 85 Main st., Flushing, L. I.
Knight, G. W., 28 Cambridge Place.
Knox, John T., 215 Montague st.
Kohn, Leonard, 184 Cornelius st.
Könecke, G. Harry, 188 Van Buren st.
Koob, Joseph J., 401 Grove st.
Kraemer, F. O., 225 Schermerhorn st.
Kraemer, F. O., Jr., 225 Schermerhorn st.
Kregeloh, H. A., 170 N. 6th st.
LaBorne, Chas. H., 781 Manhattan ave.
Lanchantin, E. F., 360 Ninth st.
Lando, Samuel A., 27 Grand ave., Corona, L. I.
Lawrence, W. E., 1 Revere Place.
Lehmann, E., 194 Ridgewood ave.
Leif, J. F., 12 Graham ave.
Leonard, M. D., 854 Flatbush ave.
Leonard, R. G., 854 Flatbush ave.
Leprohon, J. B., 105 Quincy st.
Lewis, J. M., 50 Lennox road.
Lewis, Warrington G., 184 Joralemon st.
Lienan, R. C., 137 Bainbridge st.
Long, Orville S., 781 Ocean ave.
Lundgren, C. J., 1241 Broadway.
McAteer, J. L., 4426 18th ave.
McNeill, E. W., 65 St. Johns Place.
MacDonald, C. S., 154 Clinton st.
Malcolm, James A., Oyster Bay, L. I.
Mapp, C. J., 44 Court st.
Marks, E. A., 442 Kosciusko st.
Marshall, E. W., 144 Park Place.
Master, C. M., Flushing, L. I.
Masters, E. A., 181 Joralemon st.
Matt, O. T., 696 Park Place.
Megaw, Elmer E., 1166 Dean st.
Merwin, R. E., 796 Carroll st.
Michnoff, S. J., Bay Shore, L. I.
Miller, Frank Henry, 310 Cumberland st.
Miller, F. H., 562 Bainbridge st.
Miller, Irving U., 284 Henry st.
Molatch, George, 471 56th st.
Morris, Frank, 1151 Dean st.
Morris, W. A., 657-a Macon st.
Morrison, E. V., 67 Hanson Place.
Muth, George H., 1124 Ocean ave.
Newton, H. A., 151 Clinton st.
Nies, F. H., 37 Summit st.
Nodine, A. M., 1 W. 34th st, N. Y. C.
Norcom, C. M., 1187 Bergen st.
O'Brien, H. L., 104 Prospect Park W.
Orr, C. W., 100 Hanson Place.
Orth, F. C., 612 Benedict ave., Woodhaven, L. I.
Ottolengui, R., 80 W. 40th st., N. Y. C.
Paaswell, Benjamin, 53 Woodbine st.
Parker, C. B., 154 Clinton st.
Parker, DeWitt L., 178 State st.
Parker, V. F., 124 Montague st.
Perlie, H. E., 1417 G st., N. W., Washington, D. C.
Peterson, J. O., 216 Bergen st.
Peterson, Theodore O., 429 Bergen st.
Phillips, P. J., 129 S. Oxford st.
Powell, J. K., Jr., 175 Hancock st.
Provost, W. D., 80 Lafayette ave.
Quackenbush, Hattie W., 144 Lawrence st.
Quinlan, J. S., 76 6th ave.
Quinlan, T. A., 463 Fulton st.
Quinn, A. M., 16 Seventh ave.
Reese, R. H., 103 Macon st.
Riggs, W. C., 67 Hanson Place.
Rippier, E. T., 354 Ninth st.
Ritt, Adolph, 1621 Pitkin ave.
Rogers, W. H., 506 Hancock st.
Royce, F. C., 65 Greene ave.
Russell, J. W., 6 Plaza st.
Ruyl, J. P., 18 Ashford st.
Sanbern, Frank, 184 Joralemon st.
Sanderson, R. H., 76 Rogers ave.
Sandhusen, George, 298 Cumberland st.
Scheiner, Karl, 1829 Gates ave., Mineola, L. I.
Schmidt, J. A., 1195 Dean st.
Schumaker, Frank H., 1273 Hancock st.
Scofield, F. E., 87 Macon st.
Scofield, W. L., Brewster, N. Y.
Seaver, A. D., 134 Park Place.
Sexton, E. K., 632 Throop ave.
Seyfarth, G. E., 17 Palmetto st.
Shankroff, Louis, 348 Jefferson ave.
Shapiro, Benjamin, 1480 Eastern Parkway.
Shapiro, Benj. D., 1808 Prospect Place.
Shapiro, Jacob, 430 Stone ave.
Shapiro, Simon, 430 Stone ave.
Shea, Bernard F., 324 Stuyvesant ave.
Shields, J. S., 585 Jefferson ave.
Siqueland, Theo., 67 Hanson Place.
Sloman, John J., 731 Hancock st.
Smith, Charles E., Mineola, L. I.
Smith, Dwight L., Far Rockaway, L. I.
Snyder, L. A., 433 Fulton st.

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Solomons, J. R., 47 W. 34th st., N. Y. C.
Staats, Geo. E., 417 56th st.
Steinbuch, Wm., 940 Bushwick ave.
Stevenson, A. H., 1202 Cortelyou road.
Stillman, E. E., 178 Prospect Park West.
Stillman, J. C., 184 Joralemon st.
Stoltze, V. A., 537 Bedford ave.
Strong, W. A., 214-a Livingston st.
Sullivan, J. E., 360 Tompkins ave.
Sullivan, W. F., 60 Broadway, N. Y. C.
Thompson, W. W., 383 Hancock st.
Toshack, E. W., 267 New York ave.
Turner, Wm. J., 19 W. 54th st., N. Y. C.
Tuttle, J. H., Jr., 475 Tompkins ave.
Van Note, F. L., 512 Ocean ave.
Van Orden, Chas. A., 144 Lawrence st.
Van Woert, C. T., 184 Joralemon st.
Van Woert, F. T., 184 Joralemon st.
Voegtler, T. G., 441 9th st.
Voelker, Chas. C., 899 Union st.
Walker, F. C., 309 State st.
Wallace, E. C., 57 Morton st.
Warden, F. E., 242 McDonough st.
Watson, Walter S., 5 McDonough st.
Weiskotten, R. H., 133 Hewes st.
Wengorovius, W. R., 475 Tompkins ave.
Whaley, E. G., 642 Park Place.
Whitcomb, C. B., 148 Hancock st.
White, G. W., 309 13th st.
White, M. E., 203 Spencer st.
Wicks, J. V. P., 108 Fort Greene Place.
Williams, Maurice, 87 Norman ave.
Wintraecken, J. C., 251 Clermont ave.
Wolf, P. F., 1559 Broadway.
Wood, John, 38 Halsey st.
Wyckoff, J. R., 279 Madison st.
Zametkin, Joel M., 291 Knickerbocker ave.

HONORARY MEMBERS.

Goslee, H. J., Chicago, Ill.
Hutchinson, R. G., Jr., 11 E. 48th st., N. Y. C.
Jackson, V. H., 40 E. 41st st, N. Y. C.
Jenkins, N. S., Paris, France.
Taggert, W. H., Chicago, Ill.

LIFE MEMBERS.

Abbott, F. P., 33 Cambridge Place.
Emerson, F. S., 632 Bedford ave.
Holly, R. T., 155 Montague st.
Houghton, O. E., 126 S. Oxford st.
Parker, E. G., Goshen, N. Y.
Ramsdell, W. M., Oxford, Chenango Co., N. Y.

Third District.

THE annual meeting of the Third District Dental Society of the State of New York was held on Tuesday, April 21, 1914, and the following persons were elected officers for the ensuing year:

President—Geo. Vanderpool, Albany.
Vice-president—Richard Ellis, Troy.
Recording Secretary—J. W. Canaday, Jr., Albany.
Corresponding Secretary—E. A. Bennett, Catskill.
Treasurer—P. S. Oakley, Troy.
Editor—W. A. Warren, Watervliet.
Members of Executive Council—J. W. Canaday, Sr. (regular), and F. F. Hawkins (alternate).

The following were elected to serve on State Society committees: A. M. Wright (Law); Geo. Vanderpool (Legislative); M. J. Barrett and Morton VanLoan (Oral Hygiene).

Since May 1, 1913, we have lost five members by death: June 1913, J. W. Hine, Albany; Oct., S. W. Whitney, Albany; Oct., C. F. Wheeler, Saratoga; Jan. 1914, J. G. Aldcroft, Hudson; March, G. A. Fletcher, Albany.

At the annual meeting in April five new members were elected: F. L. McCormick, Troy; C. T. Harris, Hudson; W. E. Stevens, Windham; E. H. Gale, Albany; R. B. Weston, Albany.

During the year the feeling of fellowship between the Third and Fourth District Societies was increased by union meetings in October in Schenectady and in January at Glens Falls.

Respectfully submitted,

J. W. CANADAY, JR., *Rec. Sec'y.*

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ACTIVE MEMBERS.

Allen, C. E., Albany.
Ames, F. L., Albany.
Amyot, B. E., Cohoes.
Amyot, J. A., Cohoes.
Appleton, G. N., Albany.
Appleton, J. L., Albany.
Barrett, M. J., Troy.
Bennett, E. A., Catskill.
Bird, C. H., Troy.
Bishop, C. H., Kingston.
Blatner, L. S., Albany.
Bookstein, L. H., Albany.
Boudrias, L., Cohoes.
Burke, M. R., Cohoes.
Canaday, J. W., Albany.
Canaday, J. W., Jr., Albany.
Carter, C. D., Kingston.
Carter, J. H., Cohoes.
Conkling, W. A., Catskill.
Cragin, C. B., Kingston.
Doyle, T. A., Albany.
Ellis, R., Troy.
Englert, G. A., Catskill.
Fallon, H. C., Troy.
Gale, E. H., Albany.
Gallico, J. E., Troy.
Harris, C. T., Hudson.
Hawkins, F. F., Troy.
Hudson, W. A., Albany.
Kirwan, M. F., Albany.
Kitner, F. W., Hudson.
Kittell, H. G., Troy.
Knauff, E. G., Troy.
Le Blanc, P. A., Albany.
Lynam, H. D., Troy.
McCarthy, W. E., Troy.
McCormick, F. L., Troy.
McCormick, J. J., Troy.
Mann, Josiah, Middleburg.
Michael, R. C., Troy.
Norton, A. J., Saugerties.
Oakley, P. S., Troy.
Rieger, A. B., Cohoes.
Rowe, M. L., Albany.
Rowley, H. S., Hoosick Falls.
Scott, J. A., Rensselaer.
Stevens, W. E., Windham.
Sullivan, G. A., Albany.
Vanderpool, Geo., Albany.
VanLoan, M., Albany.
Van Vleck, C. K., Hudson.
Warren, W. A., Watervliet.
Weston, R. B., Albany.
Whitbeck, T. H., Albany.
Wright, A. M., Troy.
Young, E. J., Troy.
Young, G. B., Troy.

HONORARY MEMBERS.

Angle, Edward H., New London, Conn.
McKay, Jos., Troy.
Shields, Nelson T., New York City.

Fourth District.

THE annual meeting of the Fourth District Dental Society of the State of New York was held January 20, 1914. The following were elected officers for the ensuing year:

President—A. T. Sitterly, Schenectady.
Vice-president—Wm. A. Mabie, Amsterdam.
Secretary—Earl Timeson, Schenectady.
Correspondent—L. A. Timerman, Fort Plain.
Treasurer—O. J. Gross, Schenectady.
Librarian—(Sec'y).
State Dental Examiner (term to expire 1915)—O. J. Gross, Schenectady.
Member of Executive Council—A. C. Rich (regular), Saratoga Springs, term to expire 1915.

The following were appointed to serve on State Society committees: W. E. Snyder (Law); E. B. Rhinehart (Legislative); A. S. Moore and L. A. Timerman (Oral Hygiene).

Walter L. Garrett and Daniel F. McGillicuddy, both of Glens Falls, were elected to membership in this society. James S. Garrett of Glens Falls, was elected to be an

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honorary member. Dr. P. Sloan, a life member, was lost by death.

Two meetings were held during the year; the semi-annual, a union meeting with the Fifth District held in Schenectady, and the annual, held at Glens Falls.

Respectfully submitted,

EARL TIMESON, *Rec. Sec'y.*

ACTIVE MEMBERS.

Alexander, Wm. H., Johnstown.
Amyot, P. A., Schenectady.
Barraclough, J., Hudson Falls.
Brown, Geo., Glens Falls.
Carpenter, B. F., Whitehall.
Clark, F. P., Mechanicsville.
Coleman, S. E., Malone.
Colgrove, W. H., Johnstown.
Collins, J. A., Glens Falls.
Collins, J. H., Granville.
Cooney, F. S., Schenectady.
Day, F. C., Lake Placid.
Demarest, S. A., Glens Falls.
Fielding, F. A., Glens Falls.
Foote, Leroy, Saratoga.
Foote, N. E., Whitehall.
Fouls, T. H., Glens Falls.
Gabler, L. C., Schenectady.
Garrett, W. L., Glens Falls.
Githins, W. L., Fort Edward.
Goetz, St. Elmo, Schenectady.
Gregg, H. V., Schenectady.
Grennan, F. T., Schenectady.
Gross, O. J., Schenectady.
Hastings, J. M., Saratoga.
Hawley, F. A., Waterford.
Haymen, H. A., Glens Falls.
Hiney, G. H., Cambridge.
Hodder, C. A., Canajoharie.
Hull, J. B., Schenectady.
Hurley, D. E., Warrensburg.
Jackson, H. C., Schenectady.
Lord, C. N., Schenectady.
McCann, A. H., Glens Falls.
McCulloh, S. B., Gloversville.
McGillicuddy, D. F., Glens Falls.
Mabie, W. A., Amsterdam.
Maloney, J. D., Hudson Falls.
Merrihew, P. P., Delanson.
Moore, A. S., Schenectady.
Munroe, J. A., Saranac Lake.
Petrie, R. C., Johnstown.
Powers, N. C., Saratoga.
Rhinehart, E. B., Schenectady.
Rich, A. C., Saratoga.
Roach, H. M., Glens Falls.
Roberts, D. S., Gloversville.
Rose, W. S., Schenectady.
Sayre, R. D., Gloversville.
Senecal, A. G., Plattsburgh.
Shannon, G. H., Cambridge.
Shaw, E. D., Gloversville.
Sitterly, A. T., Schenectady.
Snyder, W. E., Amsterdam.
Steer, H. G., Fort Plain.
Ston, A. H., Salem.
Stowitts, H. M., Amsterdam.
Taylor, F. E., Malone.
Tibbetts, W. H., Ballston Spa.
Timerman, L. A., Fort Plain.
Timeson, Earl, Schenectady.
Van Wie, P. B., Canajoharie.
Waldo, H. D., Schenectady.
Ward, G. E. T., Schenectady.
Wark, J. Finley, Corinth.
White, C. N., Granville.
Whitmyre, R. H., Schenectady.
Wilkinson, W. F., Warrensburg.
Williamson, W. J., Granville.
Wilson, W. B., Saranac.
Woolsey, Geo., Fonda.
Wright, Frank, Ticonderoga.
Yates, G. H., Fort Edward.

HONORARY MEMBER.

Garrett, Jas. S., Glens Falls.

LIFE MEMBERS.

Doolittle, E., Schuylerville.
Rossiter, A. A., Saratoga Springs.
Sigsbee, J. L., Canajoharie.

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Fifth District.

At the annual meeting of the Fifth District Dental Society of the State of New York the following persons were elected officers for the ensuing year:

President—J. N. Garlinghouse, Clinton.
Vice-president—C. M. Ryan, Syracuse.
Recording Secretary—A. C. Hitzelberger, Utica.
Corresponding Secretary—J. C. Sullivan, Little Falls.
Treasurer—E. R. Webb, Syracuse.
Members of Executive Council—C. B. Beach (regular), Syracuse, and Sheridan Slocum (alternate), Oswego.

The following were appointed to serve on State Society committees: C. J. Peters (Law); T. R. Cullen (Legislative); R. F. Casler and W. F. Tremaine (Oral Hygiene).

ACTIVE MEMBERS.

Algate, W. W., 308 E. Genesee st., Syracuse.
Barker, W. A., 220 Bastable Building, Syracuse.
Barnes, C. H., 912 University Bk., Syracuse.
Barrett, J. H., 515 Union Building, Syracuse.
Barry, R. W., E. Second and Bridge sts., Oswego.
Beach, G. B., 518 S. A. & K. Building, Syracuse.
Benz, F. W., 622 Onondaga Co. Bank Building, Syracuse.
Benz, J. C., 622 Onondaga Co., Bank Building, Syracuse.
Bickelhaupt, A. C., 315 Kirk Building, Syracuse.
Billington, B. H., 2 Hendricks Building, Syracuse.
Bradshaw, C. A., 402 S. Salina st., Syracuse.
Butler, G. H., 715 University Bk., Syracuse.
Carroll, J. F., 309 Kirk Building, Syracuse.
Casler, R. F., Watertown.
Cherry, C. E., 612 University Bk., Syracuse.
Clapp, H. M., Utica.
Coe, I. J., Baldwinsville.
Cooke, A. R., 815 University Building, Syracuse.
Craner, C. M., 903 University Building, Syracuse.
Cullen, T. R., 2 Wicks Building, Oswego.
Cummings, J. E., 513 Onondaga Co. Bank Building, Syracuse.
Davis, C. H., Jefferson st., Pulaski.
Davis, J. L., 304 Dillaye Bk., Syracuse.
Dower, J. H., 427 University Bk., Syracuse.
Engle, W. F., Liverpool.
Eveleigh, E. J., 213 James st., Syracuse.
Fisher, F. W., 419 Union Building, Syracuse.
Fitch, C. F., 428 S. Salina st., Syracuse.
Fowler, C. S., Watertown.
Garlinghouse, J. N., Clinton.
Gould, L. A., Watertown.
Gowland, W. G., 515 Kirk Bk., Watertown.
Grout, J. J., Skaneateles.
Guile, G. A., 717 S. A. & K. Building, Syracuse.
Guillaume, Utica.
Hall, J. S., 423 University Bk., Syracuse.
Harrington, E. E., Watertown.
Head, G. T., 314 Dillaye Building, Syracuse.
Heintz, W. J., 614 Columbia st., Utica.
Hitzelberger, A. C., 14 Hopper st., Utica.
Jones, R. E., Remson.
Jones, W. B., 317 Union Building, Syracuse.
Jones, W. H., Clinton.
Kelly, J. Otis, Rosenbloom Building, Syracuse.
Kratzer, E. B., Baldwinsville.
Lafayette, A. M., 725 University Bk., Syracuse.
McCraith, T. E., Fort Schuyler Building, Utica.
Markham, P. H., 219 Bastable Bk., Syracuse.
Mason, B. T., Fulton.
Mills, F. L., 55 W. Genesee st., Baldwinsville.
Mount, M. T., Cato.
Moyer, W. H., 12 W. Genesee st., Baldwinsville.
Murray, W. G., Herkimer.
Neff, E. R., Carthage.
Osgood, A. K., Ilion.
Packard, W. T., 324 Rosenbloom Bk., Syracuse.
Parker, G. B., Watertown.
Perry, G. I., 318 Union Bk., Syracuse.

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Peters, C. J., 812 University Bk., Syracuse.
Platner, L. W., Utica.
Potter, Geo., Cape Vincent.
Prichard, J. T., Camden.
Redway, R. B., Ilion.
Retter, A., Utica.
Richards, C. W., Phoenix.
Roblin, H. M., 604 N. Salina st., Syracuse.
Roth, G. S., 510 Gurney Building, Syracuse.
Ryan, C. M., 512 University Bk., Syracuse.
Sayers, C. A., 514 Gurney Bk., Syracuse.
Shotthafer, Ed., Utica.
Slocum, Sheridan, Oswego.
Smith, A. F., 514 University Bk., Syracuse.
Smith, Ed. A., Rome.
Spriggs, C. J., Rome.
Stillman, A. A., 620 Gurney Bk., Syracuse.
Sullivan, J. C., Little Falls.
Talley, D. B., 714 Dillaye Bk., Syracuse.
Tibbetts, F. C., Fayetteville.
Tompkins, H. H., Utica.
Tremain, W. P., Rome.
Turner, R. C., Oswego.
Webb, E. R., 415 University Bk., Syracuse.
Wein, P. S., 602 N. Salina st., Syracuse.
Wells, Albert, Skaneateles.
White, Ed. R., 718 S. A. & K. Building, Syracuse.
Wright, Geo. L., 202 W. Genesee st., Syracuse.

Sixth District.

THE annual meeting of the Sixth District Dental Society of the State of New York was held March 27 and 28, 1914, and the following persons were elected officers for the ensuing year:

President—H. H. Turner, Marathon.
Vice-president—H. D. Whitmarsh, Binghamton.
Recording Secretary—John D. Ogden, Binghamton.
Treasurer—E. L. Pitcher, Cooperstown.
Delegate to National Convention—C. F. Baylis, Oneonta.
Censors—Frank B. Darby, Elmira; W. J. LeSuer, Oneonta; H. Hoffman Fish, New Berlin.
State Dental Examiners—A. M. Holmes, Morrisville, and J. B. West, Elmira.
Executive Council—J. B. West (regular), Elmira, and Chas. M. Dunne (alternate), Norwich.

The following were appointed to serve on State Society committees: F. A. Ford, Cazenovia (Law); W. J. LeSuer, Oneonta (Legislative); H. D. Whitmarsh, Binghamton, and Chas. M. Dunne, Norwich (Oral Hygiene).

Respectfully submitted,
JOHN D. OGDEN, *Rec. Sec'y.*

ACTIVE MEMBERS.

Arbuckle, J. H., Delhi.
Barnes, A. S., Oneonta.
Barnett, John F., 204 Snyder Building, Elmira.
Barton, W. W., Binghamton Savings Bank Building, Binghamton.
Bassett, C. G., Sidney.
Baylis, C. F., Oneonta.
Burdick, G. A., Homer.
Burghardt, H. D., Whitney Point.
Champlin, F. W., Oneida.
Chapman, B. O., 310 E. Water st., Elmira.
Cowan, J. H., Cortland.
Cox, C. W., Horseheads.
Crowley, A. J., Ithaca.
Cull, H. J., Cazenovia.
Cunningham, H. E., Hobart.
Darby, F. H., 306 W. Church st., Elmira.
Decker, Geo. M., Owego.
Denike, G. A., Kilmer Building, Binghamton.
Dolan, B., Security Mutual Building, Binghamton.
Dunne, C. M., Norwich.
Ellis, J. S., 202 E. Water st., Elmira.
Erwin, J. J., Elmira.
Faulkner, J. V., Oneida.
Fitch, H. E., 219 W. Church st., Elmira.
Ford, F. A., Cazenovia.
Frisbie, J. D., Andes.
Garvin, F. A., Oneida.
Gill, E. S., Morrisville.
Griswold, G. N., Unadilla.

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Haase, Ferd., Jr., 52 Lake st., Elmira.
Hamilton, H. B., Ithaca.
Hanks, C. S., Oneonta.
Heiss, H. V., Lestershire.
Hill, Wm. L., Owego.
Howe, Fred. B., N. Aurora st., Ithaca.
Howe, J. B., N. Aurora st., Ithaca.
Ingalls, C. E., Cortland.
Ingalls, L. S., Cortland.
Ivory, Jas. T., 92 Chenango st., Binghamton.
Johnson, R. A., Bainbridge.
Kelly, John B., Kilmer Building, Binghamton.
Knapp, L. E., Deposit.
LeSuer, W. J., Oneonta.
McCall, F. W., 24 Centenary st., Binghamton.
Mayor, Wm. E., Owego.
Miller, H. J., New Berlin.
Mills, E. E., 110 E. Water st., Elmira.
Mills, J. J., 110 E. Water st., Elmira.
Mitchell, H. B., 305 E. Church st., Elmira.
Moore, H. A., 126 E. Water st., Elmira.
Needham, A. V., Oneida.
Nelson, E., Waverly.
Noble, L. E., Endicott.
Ogden, J. D., Kilmer Building, Binghamton.
Ogden, Wm. A., 55 Chenango st., Binghamton.
Payne, D. B., Sherbourne.
Peterson, H. A., 113 N. Main st., Elmira.
Pitcher, E. L., Cooperstown.
Pritchard, E. J., Hancock.
Pritchard, W. H., Newark Valley.
Roe, M. M., Owego.
Root, R. T., 120 Main st., Binghamton.
Sharp, W. M., Binghamton.
Smith, F. W., 328 E. Water st., Elmira.
Soden, F. B., Norwich.
Stuart, T. R., Ithaca.
Sturdevant, T. B., Hulitt Building, Elmira.
Suter, A. B., 100 W. Water st., Elmira.
Tatlock, F. H., Oneonta.
Thompson, C. E., Oxford.
Turner, A. D., Binghamton.
Turner, H. H., Marathon.
Waples, E. Carl, 148 W. Water st., Elmira.
Wells, H. P., Hamilton.
West, J. B., 126 E. Water st., Elmira.
Whitmarsh, H. D., 122 Oak st., Binghamton.
Wilbur, R. O., 313 E. Water st., Elmira.
Willis, F. M., Ithaca.

HONORARY MEMBERS.

Burchill, J. E., Cortland.
Flaherty, J. V., Chittenango.
Garling, N. L., Ithaca.
Hall, Wm. H., Binghamton.
Hoysradt, G. W., Ithaca.
Kelly, W. B., Towanda, Pa.
King, H. B., Roxbury.
McCall, J. O., Buffalo.
Melotte, G. W., Ithaca.
Newell, J. K., Towanda, Pa.
Quintero, J. M., Lyons, France.
Rischell, E. C., Athens, Pa.
Smith, W. W., Montrose, Pa.
Spencer, C. W., Sidney.
Thompson, F. R., Homer.
Watts, Willis E., Lyons, France.

LIFE MEMBERS.

Downs, E. D., Owego.
Fish, M. H., New Berlin.
Holmes, A. M., Morrisville.
Jewell, M. D., Richfield Springs.

Seventh District.

THE annual meeting of the Seventh District Dental Society of the State of New York was held April 18, 1914, and the following persons were elected officers for the ensuing year:

President—George C. Lowe.
Vice-president—A. P. Burkhart.
Recording Secretary—C. A. Howland.
Corresponding Secretary—C. J. Fraley.
Treasurer—C. G. Morsheimer.
State Dental Examiner (term to expire 1915)—W. A. White, Phelps.
Member of Executive Council—B. S. Hert (regular), term to expire 1916.

The following were appointed to serve on State Society committees: B. W. Palmer, Rochester (Law); E. G. Link, Rochester

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(Legislative); W. W. Belcher, Rochester, and A. W. Smith, Rochester (Oral Hygiene).

At the annual meeting, held at the Seneca Hotel, the guests of honor were Dr. Homer C. Brown, president of the National Dental Association, Dr. Otto U. King, secretary of National Dental Association, and Dr. A. S. Downing, assistant commissioner of education of the state Educational department. A dinner followed, at which the above-named guests were the principal speakers.

During the past year we have lost a number of members through suspension for non-payment of dues. Three have been lost through death, Drs. L. C. Jones, H. F. Redfield, and Frank L. Sibley; two have resigned.

Dr. B. S. Hert was elected to succeed himself on the Board of Directors, Dr. Hofheinz succeeds himself on the Board of Censors, and Dr. L. S. Goble was elected to fill the unexpired term of Dr. Sibley on the Board of Censors.

Nineteen new members were elected at this meeting.

Respectfully submitted,

C. A. HOWLAND, *Rec. Sec'y.*

ACTIVE MEMBERS.

Agnew, F. L., 63 Monroe ave., Rochester.
Allen, D. H., Honeoye Falls.
Avery, R. B., Auburn.
Bachman, C. C., Waterloo.
Banks, J. L. E., Dake Building, Rochester.
Barr, W. H., 800 Main st. W., Rochester.
Barrett, W. R., Spencerport.
Baylor, Wm., Nunda.
Becker, A. D., Palmyra.
Beebee, J. H., 913 C. of C. Building, Rochester.
Belcher, H. L., Seneca Falls.
Belcher, W. W., 186 Alexander st., Rochester.
Bennett, C. A., 317 Powers Building, Rochester.
Bliss, T. C., Hornell.
Booth, C. F., Canandaigua.
Bostwick, Wm. A., 133 Clinton ave. S., Rochester.
Bradley, M. C., Avon.
Brininstool, C. L., 1103 Granite Building, Rochester.
Brown, H. O., Waterloo.
Bryant, F. E., 308 Jefferson ave., Rochester.
Bryant, S. Roy, 308 Jefferson ave., Rochester.
Buckland, C. F., Corning.
Burkhart, A. P., 52 Genesee st., Auburn.
Burkhart, G. A. P., 121 Genesee st., Auburn.
Burns, G. G., 47 Elwood Building, Rochester.
Cameron, J. H., Caledonia.
Carey, J. H., 15 N. Union st., Rochester.
Charles, O. R., Naples.
Chase, C. D., 174 Garson ave., Rochester.
Clapp, E. A., Livonia.
Clark, B. F., 133 Clinton ave. S., Rochester.
Conklin, Wirt H., Mercantile Building, Rochester.
Conyne, R. J., 1064 Main st. E., Rochester.
Cowan, J. W., Geneseo.
Crump, I. J., 20 Triangle Building, Rochester.
Demerath, C. F., 511 E. & B. Building, Rochester.
Dengler, F. J., 214 Wilder st., Rochester.
Dunn, J. E., 884 Main st. W., Rochester.
Durrant, J. B., Honeoye Falls.
Eckler, H. F., 640 South ave., Rochester.
Foley, J. M., corner Plymouth and Clarissa sts., Rochester.
Fraley, C. J., Geneseo.
Furner, J. S., Lima.
Gamble, W. D., Wayland.
Gilbert, L. H., 703 E. & B. Building, Rochester.
Goble, L. S., 40 Triangle Building, Rochester.
Graves, J. W., 32 Triangle Building, Rochester.
Griswold, E. R., Dansville.
Hall, A., 43 Main st., Hornell.
Hanna, J. N., 575 Main st. W., Rochester.
Herrington, J. M., Penn Yan.
Hert, B. S., 713 C. of C. Building, Rochester.
Hettig, A. F., 227 Cutler Building, Rochester.
Hicks, B. G., Canandaigua.
Hofheinz, R. H., 818 C. of C. Building, Rochester.
Holcombe, R. J., Mercantile Building, Rochester.
Holmes, H. N., Canandaigua.
Horton, F. C., Clyde.
Horton, G. L., 12 William st., Auburn.
Howland, C. A., 901 C. of C. Building, Rochester.
Hulme, M. L., 75 S. Fitzhugh st., Rochester.
Ivory, F. M., 57 Triangle Building, Rochester.
Kohler, M. W., Fairport.
Kühn, F. W., Dansville.

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Lewis, E. F., 508 E. & B. Building, Rochester.
Line, J. Edw., 1104 Granite Building, Rochester.
Link, E. G., 226 Cutler Building, Rochester.
Locke, G. E., Brockport.
Lowe, G. C., 813 C. of C. Building, Rochester.
Lynch, C. G., 164 Park ave., Rochester.
McDermott, T. H., 216 Merriman st., Rochester.
McIntee, J. T., 248 Cutler Building, Rochester.
McMullen, M. F., 383 Main st. E., Rochester.
McNaughton, H. J., Penn Yan.
Marvin, G. P., 211 Cutler Building, Rochester.
Meaker, S. R., Auburn.
Messerschmitt, F., 1023 Granite Building, Rochester.
Meyers, W. A., 124 Genesee st., Auburn.
Middaugh, J. E., Phelps.
Milne, C. C., 3 Lyell ave., Rochester.
Moll, C. F., 1 East ave., Rochester.
Morsheimer, C. G., 133 Clinton ave. S., Rochester.
Newcomb, H. H., 193½ Genesee st., Rochester.
O'Neill, W. B., 747 Main st. W., Rochester.
Palmer, W. B., 232 University ave., Rochester.
Parmelee, J. H., 418 Mercantile Building, Rochester.
Parrish, W. A., Avon.
Povall, W. H., Mt. Morris.
Proseus, F. W., 270 Monroe ave., Rochester.
Pulver, P. C., 525 Mercantile Building, Rochester.
Reeves, H. C., Fairport.
Requa, L., 324 Cutler Building, Rochester.
Rood, F. M., 700 E. & B. Building, Rochester.
Sager, A. E., 624 Mercantile Building, Rochester.
Sanford, J. E., 35 Elwood Building, Rochester.
Saunders, B. G., 83 East ave., Rochester.
Saunders, T. D., Hornell.
Schake, Sarah M., 711 C. of C. Building, Rochester.
Schlottman, E. L., 809 C. of C. Building, Rochester.
Scott, J. J., 901 C. of C. Building, Rochester.
Sebold, F. C., Auburn.
Shaddock, F. J., 819 C. of C. Building, Rochester.
Sharp, E. T., Victor.
Showers, G. F., Corning.
Slorah, G. W., 157 Clinton ave. N., Rochester.
Smith, A. W., 525 C. of C. Building, Rochester.
Smith, P. H., 86 Hickory st., Rochester.
Smith, P. W., 921 C. of C. Building, Rochester.
Smith, W. W., 83 East ave., Rochester.
Stott, H. B., 433 Mercantile Building, Rochester.
Sutherland, L. D., Canandaigua.
Sweet, E. J., 44 Main st., Hornell.
Tarrant, F. J., 837 Main st. W., Rochester.
Thorn, C. A., 702 Clinton ave. N., Rochester.
Tillotson, R. R., Lyons.
Vanderbelt, C. R., 412 Beckley Building, Rochester.
Waldron, C. R., 1129 Granite Building, Rochester.
Wallace, W. R. J., Canandaigua.
Weller, J. L., Jr., 424 Mercantile Building, Rochester.
White, W. A., Phelps.
Wilbur, W. C., Corning.
Windell, W. A., 720 E. & B. Building, Rochester.

HONORARY MEMBERS.

Adams, D. F., Minnesota.
Goode, G., New York.
Howard, C. T., Rochester.
Jenkins, N. S., Paris.
Miller, H. S., Rochester.
Nicholson, C. H., Ontario.
Smith, M. H., Colorado Springs.
Walters, J. S., Eugene, Ore.
Ward, C. H., Rochester.
Watson, G. H., Berlin.

LIFE MEMBERS.

Elmendorf, C., Penn Yan.
*Jones, L. C., Wolcott.
La Salle, B. F., Rochester.
Miller, H. S., Rochester.
Osgood, A., Bath.

* Deceased.

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Eighth District.

THE annual meeting of the Eighth District Dental Society of the State of New York was held April 21, 1914, and the following persons were elected officers for the ensuing year:

President—J. G. Roberts, Buffalo.
Vice-president—Harry F. Tanner, Medina.
Recording Secretary—M. Burton Eshleman, 170 Hodge ave., Buffalo.
Corresponding Secretary—B. W. Whipple, Olean.
Treasurer—F. A. Ballachey, Buffalo.
Librarian—A. T. Isham, Buffalo.
Assistant Librarian—Frank W. Low, Buffalo.
Board of Censors—A. E. Mimmack, H. J. Burkhart, W. B. Dickson, A. E. Preston, H. A. Pullen.
State Dental Examiners—Harvey J. Burkhart (regular), and James A. Sherwood (alternate).
Members of Executive Council—Robert Murray (regular), and Abram Hoffman (alternate).

The following were appointed to serve on State Society committees: A. E. Mimmack (Law); H. J. Burkhart (Legislative); Ralph E. Luther and J. Wright Beach (Oral Hygiene).

Quoting from our retiring president's address, Dr. Hoffman said in part: "The most important accomplishment of our society during the past year was the realization of free dental dispensaries under municipal maintenance for the worthy poor children of Buffalo. The liberal, public-spirited offer of Dean Daniel H. Squire for the Dental Department of the University of Buffalo, and the untiring efforts of Dr. M. B. Eshleman were largely instrumental in bringing this issue to a successful termination. The credit stands to the Eighth District Dental Society, and as far as I know it is the first and only dental society that has had a group of its members appointed to the board of health of any city."

Through the efforts of our energetic executive we have enjoyed probably the most successful year in our history, the attendance at our regular meetings having shown an increase of 115 per cent. over that of the previous year. We held four regular meettings, where the drawing cards were Dr. Weston A. Price of Cleveland, Ohio, on "The Work of the National Research Committee," Drs. Goler and Weet of Rochester, on "Effect of Oral Hygiene on the Schools of Rochester." Dr. Marshall Clinton on "Infection of the Oral Cavity." Dr. Frank W. Low, on "Susceptibility and Immunity to Rapid Superficial Enamel Decay."

The first of our two special meetings was held in union with the Fifth, Sixth, and Seventh District Societies at Elmira, N. Y., in November, and the second, our union banquet, in January with the Buffalo City Dental Association.

Respectfully submitted,
M. BURTON ESHLEMAN, *Rec. Sec'y.*

ACTIVE MEMBERS.

Allen, Chas. E., Brocton.
Backus, W. M., 475 Grant st., Buffalo.
Ballachey, F. A., 450 Elmwood ave., Buffalo.
Barrows, D. E., Olean.
Bartlett, W. B., Castile.
Bates, O. W., 186 Seneca st., Buffalo.
Beach, J. W., 131 Allen st., Buffalo.
Beyer, F. A., 559 Main st., Buffalo.
Boughton, W. E., Batavia.
Brown, Robert, 66 St. James place, Buffalo.
Brumberg, Louis, 373 Clinton st., Buffalo.
Buell, C. K., 131 Allen st., Buffalo.
Burkhart, H. J., Batavia.
Burley, J. W., Gowanda.
Burns, E. F., 1375 Main st., Buffalo.
Butler, C. S., 267 Elmwood ave., Buffalo.
Carmichael, D. D., LeRoy.
Caulkins, C. R., Perry.
Caulkins, R. W., Perry.
Cavers, W. W., 722 Main st., Buffalo.
Chester, H. M., 51 Park st., Buffalo.
Childs, Lowell, Springville.
Christenson, J. C., 106 Falls st., Niagara Falls.

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Clements, J. L., 530 W. Utica st., Buffalo.
Collins, J. F., 580 Elmwood ave., Buffalo.
Collins, J. P., 504 Brisbane Building, Buffalo.
Coon, W. W., Alfred.
Cursons, Leon V., 331½ Franklin st., Buffalo.
Dayment, F. L., 450 Elmwood ave., Buffalo.
Dewey, C. E., Batavia.
Dickson, W. B., 446 Genesee st., Buffalo.
Diltz, David A., Warsaw.
Dixon, L. A., 917 Jefferson st., Buffalo.
Downes, C. R., 100 Main st., Lockport.
Duncan, J. C., 6 West ave., Lockport.
Earley, S. J., Olean.
Edgerley, S. C., 743 Fillmore ave., Buffalo.
Ellis, W. H., 397 Delaware ave., Buffalo.
Ellwood, G. T., 55 Parker ave., Buffalo.
Ernsmere, J. B., 308 W. Ferry st., Buffalo.
Eschelman, S., 421 Franklin st., Buffalo.
Eshleman, M. B., 170 Hodge ave., Buffalo.
Evans, F. M., Fredonia.
Farmer, E. J., 265 W. Ferry st., Buffalo.
Fay, M. L., 379 Hudson st., Buffalo.
Fenton, W. C., Attica.
Flagg, C. E., 158 Anderson place, Buffalo.
Frank, F. L., 718 Elmwood ave., Buffalo.
Frey, George J., 209 D. S. Morgan Building, Buffalo.
Garretson, J. L., 481 Elmwood ave., Buffalo.
Garrett, F. S., 527 Main st., Buffalo.
Gemmill, R. A., Lockport.
Graf, E. G., 706 Michigan st., Buffalo.
Greenen, G. J., 221 Hampshire st., Buffalo.
Greenfield, W. C., 169 Northland ave., Buffalo.
Gregg, M. A., 103 Genesee st., Buffalo.
Grove, W. V., 610 Ellicott Square, Buffalo.
Hammersmith, P. C., 25 Indian Church road, Buffalo.
Harper, F. E., Angola.
Hartman, J. A., Albion.
Havens, F. C., Niagara Falls.
Hicks, J. R., 55 Allen st., Buffalo.
Hicks, T. A., 55 Allen st., Buffalo.
Hill, Frank P., 731 Prospect ave., Buffalo.
Hoffman, A., 529 Franklin st., Buffalo.
Hollister, A. H., 13 E. Main st., Fredonia.
House, C. W., Holland.
Hughey, G. M., 267 W. Utica st., Buffalo.
Isham, A. F., 85 N. Pearl st., Buffalo.
Jackson, Graham E., The Wellesly, Buffalo.
Jackson, L. E., Franklinville.
Jones, H. F., 2070 Niagara st., Buffalo.
Jones, O. E., Wellsville.
Jung, A. H., 64 Goodell st., Buffalo.
Jung, E. P., 584 Genesee st., Buffalo.
Kehr, G. B., 242 Forest ave., Buffalo.
Kendall, C. A., 316 Pearl st., Buffalo.
Kendall, F. A., 397 Delaware ave., Buffalo.
Kitching, H. W., Hamburg.
Leake, J. W., 53 Main st., Lockport.
Leigh, F. P., Attica.
Leitze, G. L., 1137 E. Genesee st., Buffalo.
Leland, Lloyd E., 1872 Niagara st., Buffalo.
Lewis, G. T., 587 Main st., Buffalo.
Low, F. W., 52 N. Pearl st., Buffalo.
Lugsden, F. G., 131 Allen st., Buffalo.
Luther, R. E., Batavia.
McCall, J. O., 488 Franklin st., Buffalo.
McCarthy, A. G., 154 Gold st., Buffalo.
McCoy, D. H., 899 Main st., Buffalo.
McMichael, H. R., 15 Oxford ave., Buffalo.
Madden, J. J., 49 Niagara st., Buffalo.
Main, D. T., 337 Niagara st., Buffalo.
Mair, C. R., 1157 Michigan st., Buffalo.
Mallory, J. P., 463 W. Ferry st., Buffalo.
Marshall, W. E., Box 27, Eden.
Meisburger, L., 85 N. Pearl st., Buffalo.
Middleton, C. O., 36 Young st., Tonawanda.
Mimmack, A. E., 795 Elmwood ave., Buffalo.
Montgomery, W. R., 505 Franklin st., Buffalo.
Morgan, G. H., 2 N. Pearl st., Buffalo.
Mouthrup, G. F., 273 W. Ferry st., Buffalo.
Muir, Robert, 21 Main st., Gowanda.
Mulcahy, L. L., Batavia.
Muntz, E., 867 Washington st., Buffalo.
Murray, Robert, 761 Elmwood ave., Buffalo.
Newman, T. E., 546 Tonawanda st., Buffalo.
Noyes, W. P., Olean.
Otis, N. L., East Aurora.
Packwood, E. S., 1370 Main st., Buffalo.
Pankow, C. A., 327 William st., Buffalo.
Parker, R. C., Sycamore and Fillmore aves., Buffalo.
Paxson, G. A., Hamburg.
Poole, P. A., 14 S. Division st., Buffalo.
Prefert, Albert, 795 Genesee st., Buffalo.
Prentice, W. H., Warsaw.
Preston, A. E., Delevan.
Pringle, G. W., 69 Gluck Building, Niagara Falls.
Pullen, H. A., 131 Allen st., Buffalo.
Raub, H. D., Olean.
Read, E. M., Perry.
Reynolds, H. E., 577 Broadway, Buffalo.
Richardson, C. G., 101 Main st., Batavia.
Richardson, E. M., 101 Main st., Batavia.
Roberts, J. G., 174 E. Ferry st., Buffalo.
Robinson, L. W., 129 Elmwood ave., Buffalo.
Ruszaj, S. E., 1012 Broadway, Buffalo.

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Ryerse, O. G., 727 Seneca st., Buffalo.
Schnitzspahn, E. E., 18 St. Johns Place, Buffalo.
Sharp, C. H., 73 Main st., Lockport.
Sherwood, J. A., 283 Bryant st., Buffalo.
Simmons, G. H., Medina.
Skinner, G. W., 70 W. Chippewa st., Buffalo.
Skinner, O. M., 968 Ridge road, Lackawanna.
Snow, G. B., 231 Kennebec st., Long Beach, Cal.
Sortore, J. F., Belmont.
Squire, D. H., 488 Franklin st., Buffalo.
Squires, L. A., 2337 Main st., Buffalo.
Stanton, E. P., 361 Porter ave., Buffalo.
Steigerwald, C. C., 519 William st., Buffalo.
Stiker, A. G., Addison.
Storms, C. L., 153 E. Utica st., Buffalo.
Sweeney, John, Olean.
Tanner, H. F., Medina.
Tench, J. M., 1353 Jefferson st., Buffalo.
Tench, R. W., 1353 Jefferson st., Buffalo.
Terry, I. L., 737 Seneca st., Buffalo.
Thompson, D. M., 311 Hartshorn Building, Niagara Falls.
Tillotson, C. R., 308 W. Ferry st., Buffalo.
Todd, E. L., Dunkirk.
Underwood, F. H., 1063 Ellicott st., Buffalo.
Walsh, M. P., Youngstown.
Wardner, J. F., Lackawanna.
Warner, C. A., 39 S. Niagara st., Tonawanda.
Warner, F. W., Angelica.
Washburn, F. M., Perry.
Waugh, L. M., 576 Fifth Ave., New York.
Weaver, F. C., 6 West ave., Lockport.
Whipple, B. W., 301 Union st., Olean.
Whipple, E. C., 301 Union st., Olean.
Whipple, H. L., Cuba.
Wiles, L. E., Fillmore.
Wilmot, Max D., 972 Main st., Buffalo.
Wolfsohn, Myron D., 171 Cedar st., Buffalo.
Woodley, F. E., 123 Falls st., Niagara Falls.
Young, D. H., Attica.

Ninth District.

THE annual meeting of the Ninth District Dental Society of the State of New York was held April 10, 1914, and the following persons were elected officers for the ensuing year:

President—H. C. Bennett.
Vice-president—Robt. Morrow.
Secretary—L. W. Helms.
Correspondent—W. M. Stanbrough.
Treasurer—John T. Hepworth.
Librarian—H. L. Barnum.
State Dental Examiners—E. G. Parker, Goshen, and C. G. Turner, Poughkeepsie.
Members of Executive Council—Stephen Palmer (regular), and G. A. Hammond (alternate).

The following were appointed to serve on State Society committees: A. W. Twiggar (Law); H. C. McBrair (Legislative); Stephen Palmer and W. V. Randall (Oral Hygiene).

During the year the society has held four regular and one special meeting.

Eight new members have been taken into the society; one has been dropped. The society suffered its first loss by death—Dr. J. Walsh of Newburgh, who died December last.

The society now numbers 61 active and 1 honorary member.

Respectfully submitted,
JOHN T. HEPWORTH, *Treas.*

ACTIVE MEMBERS.

Allen, E. J., Port Chester.
Anderson, A. E., Peekskill.
Ashplant, P. R., Newburgh.
Ball, Bertram, Yonkers.
Bannan, P. C., Newburgh.
Barnum, H. L., Newburgh.
Bauder, P., Newburgh.
Bedell, W. H., Poughkeepsie.
Bennett, H. C., Newburgh.
Carr, Lewis H., Newburgh.
Cole, J. P., Dobbs Ferry.
Conover, C. A., Newburgh.
Cowles, E., Fishkill-on-Hudson.
DeWitt, H. S., Middletown.
Downing, V. F., Poughkeepsie.
Dunning, W. O., Middletown.
Duryee, E. C., Peekskill.
Ehleider, T. J., Poughkeepsie.
Ermann, F. P., Warwick.
Fancher, W. M., Ossining.

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Fisher, Wm. C., Bronxville.
Foote, P. L., Poughkeepsie.
Franzius, G. H., Bronxville.
Gurnee, C. D., Beacon.
Hammond, G. A., Port Jervis.
Hammond, Grace, Beacon.
Helms, L. W., Peekskill.
Hepworth, John T., Wappingers Falls.
Johnson, J. H., Port Jervis.
Kidd, W., Newburgh.
Lansing, C. T., Yonkers.
McBrair, H. C., Middletown.
McLean, D. W., Mount Vernon.
Mills, J. J., Port Jervis.
Morris, Geo. W., Central Valley.
Morrow, Robt., Nyack.
Northrup, G. A., Poughkeepsie.
Palmer, Stephen, Poughkeepsie.
Parker, E. G., Goshen.
Patterson, J. E., Poughkeepsie.
Phin, A. E., Peekskill.
Place, Arthur, Mount Vernon.
Randall, W. V., Newburgh.
Ryder, H. L. B., Poughkeepsie.
Smith, Frederick, Newburgh.
Southerland, J. R., Monroe.
Stanbrough, W. W., Newburgh.
Suffern, E. R., Suffern.
Sweezy, F. W., Port Jervis.
Teller, W. S., Newburgh.
Thompson, C. H., Goshen.
Tice, C. H., Middletown.
Traver, W. E., Red Hook.
Turner, C. G., Poughkeepsie.
Twiggar, A. W., Ossining.
Varcoe, E. R., Goshen.
Vernon, G. H., Middletown.
Writer, G. S., Nyack.
Wygant, C. P., Peekskill.

HONORARY MEMBER.

Hutchinson, R. G., Jr., New York City.

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President's Address.

By Dr. WM. W. SMITH, Rochester.

A CORDIAL welcome is extended to all in attendance at this, the forty-sixth annual meeting of the Dental Society of the State of New York.

MEMBERSHIP.

The fivefold increase in membership which was established last year presents an unusual aspect to the proceedings of this society, and suggests some changes in its policy. On account of the adoption of the reorganization plan, it has been particularly interesting to note the attitude of the members throughout the state toward society matters. It was predicted by some that it would cause a decrease in interest and members. Observation, however, has led to the belief that the reverse is the case, except in one or two of the districts; the reports show that since the last annual meeting many new members have joined the society, and in addition to this, many who had neglected to pay their dues through lack of interest have paid in full and have been reinstated.

The figures seem to indicate only a small increase in the membership of the State Society. This is due to the fact that, when the reorganization plan went into effect, several of the districts reported the names of their members and paid the dues of many who were delinquent. This year those who have not met this obligation were dropped from the list; their indifference was of a chronic nature, and not due to the society's change of policy.

DISTRICT SOCIETIES' ACTIVITY.

An understanding of the various activities throughout the state—the scientific research movement in the First and Eighth districts, the educational campaign of the Second and Ninth districts, and the free dispensary work of the Seventh and other districts—should stimulate all of the districts to a healthy emulation.

THE BULLETIN.

The *Bulletin*, which was published this year for the first time, was inaugurated for the purpose of conveying a knowledge of these activities to all parts of the state, with the intention of producing this interrelationship, with its co-related results of arousing the interest of inactive members and of encouraging others to become members. It had the further

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purpose of conveying the same spirit to other states throughout the Union, which is in accord with the sentiment expressed by the National Association of State Officers. The mutual benefit which is derived from this interchange is an important consideration.

A vast amount of work was necessitated in the publication of this initial issue of the *Bulletin*. Future issues, if there will be such, will require far less effort, as the district secretaries and others concerned will understand just what is expected of them. This will further be reduced if the work is in the hands of a regular appointed committee, who would have all the details in charge. The cost this year was also greater than future issues will require. This could be reduced by changing the style of the pamphlet, or by the addition of a few high-class selected advertisements, or by both. These details could be determined by the Executive Council.

This publication, if continued, may evolve into or at least encourage a larger and more important field of operation, if the sentiment manifested at present continues. There is a growing tendency toward the control of journalism by the profession. The manufacturers and dealers in dental supplies are a valuable adjunct in the development of the profession and have served us faithfully in the matter of periodical dental literature, but the time is undoubtedly coming when our journalism must be placed on a broader professional basis.

ORAL HYGIENE WORK.

The work of the Oral Hygiene Committee is deserving of special commendation. A scenario for a motion-picture film entitled "Oral Health," which is highly interesting and educational, has been presented to the Executive Council for its approval. This has already entailed a vast amount of work by the committee, and if completed will mean much more. The committee is now hoping to be able to carry this work to completion, and produce the completed film for its initial exhibition at the meeting of the National Association in Rochester in July.

This committee is also maturing other plans of educational work, which will receive its more active attention after the motion-picture film is completed. It should receive the hearty co-operation of the entire society.

PROPOSED REGULATION OF MEMBERSHIP IN DISTRICT AND STATE SOCIETIES.

There is a discrepancy between the charter and the by-laws of the society. The latter provide that one cannot become a member of the State Society unless he is a member of the society of the district in which he practices. This imposes a hardship on many who practice in one district and reside in another, as is the case notably in the First, Second, and Ninth districts.

This condition should be obviated by allowing the choice of membership either in the society of the district in which one resides or where one practices, but no one should be an active member in more than one district.

In this connection, it is suggested that the fact be borne in mind that all of the districts are simply units of the State Society. Active membership should imply or include associate membership in every other district *without dues*. It should be the privilege of every member of a district unit to attend the meetings

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of every other unit, and enjoy all privileges except those of voting and holding office. Associate membership *with dues* should be open only to non-members of the State Society.

An act of the Legislature provides that the components of the State Society shall be "under the name of the district dental society of the respective judicial districts where they shall be located." This is not in accord with the present spirit and letter of this society. A more comprehensive wording would be "The ——— District of the Dental Society of the State of New York," designated by the respective judicial districts. It would be well to consider the matter of making such change at an early opportunity.

PROPOSED CHANGE IN PLACE OF MEETING.

On account of the increase in membership and other conditions of this society, it seems advisable at this time to consider the matter of making it possible to hold the annual meeting in some of the other large cities of the state. This would have a tendency to promote the healthy rivalry which is necessary to growth. It would avoid stagnation, would relieve certain local men of burdens which have been imposed upon them year after year, and would arouse to activity a new element in each section where the meetings may be held—the indifferent, and especially the younger men, would take a direct interest in the affairs of the society. This plan was adopted two years ago by the New York State Medical Society after more than a century of meetings in Albany, and the benefits have been beyond the expectations of its members.

PROPOSED OFFICE OF PRESIDENT-ELECT.

Under the present plan for the election of officers of this society, the vice-president is expected to be elected to the presidency. This, however, is not always the case, and the vice-president cannot make such asumption. He must remain in the background, and make only such preparations as may be done without observation; so, at the time of his ascendency, he at once assumes arduous duties with only a partial preparation. This could be avoided by establishing another office, which may be designated as the president-elect, such an officer to be elected one year in advance of his term as active president. He would have one year then in which to make active and definite preparations, so decreasing his burdens and increasing his efficiency. The American Medical Association has pursued this plan for the last five years, and finds that it works decidedly to the advantage of that society.

Specifically, the operation of this plan would be in this manner: For the first year of its adoption, the active president would be elected as usual, then a president-elect and a vice-president would be elected. In subsequent years, the president-elect would succeed to the presidency automatically, and another president-elect would be selected in the usual manner, presumably by the advancement of the vice-president.

PROPOSED ABOLITION OF NECROLOGY COMMITTEE.

The work which has hitherto been done by the Necrology Committee of this society is rendered impracticable and unnecessary by the increase in membership and the affiliation of the district units. These reports will appear in the Transactions under the reports of the district secretaries.

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ALTERATION OF RULES REGARDING CHANGES OF BY-LAWS.

There is a provision in the by-laws which prevents any change being made in them until one year after the presentation of the proposition for such change. This is unnecessary, and in some cases militates against the best interests of the society. Twenty-four hours should be sufficient time for the consideration of some of the proposed changes that should be made. It should be provided, however, that if any member objects, action on a proposed change must be deferred until the next meeting.

LEGISLATION IN REGARD TO DENTAL PRACTICE.

The subject of legislation has received considerable attention during the past year. The paper on this subject which was presented by Dr. Ottolengui one year ago, and the appointment of a special Legislative Committee to consider the suggestions made in that paper and to make report to the Council at this meeting, has elicited considerable discussion in several of the districts, and interest in the subject has become quite general throughout the state. Illegal and unethical practice is so much in evidence that serious consideration of the subject is its natural outcome. Notwithstanding the persistent and arduous efforts of the Law Committee, the situation is such that it has not succeeded in remedying or even in checking this condition.

There is a general feeling of disappointment that the bill known as the "Seeley Dental Bill," which was presented to and approved by both the Senate and Assembly, should not have become a law. This bill clearly defined dental practice, and contained provisions which were approved by the committee and others interested. It was supported by the better class of dentists; it was opposed by the illegal practitioner and the charlatan.

This bill did not provide for annual registration of dentists, which phase of the subject has been generally discussed during the year. This discussion has resulted quite unmistakably in a growing sentiment in favor of some form of annual registration, with a fee of one or two dollars, thus providing for the maintenance of an executive officer, and deputies, if necessary, to attend to registrations and prosecutions.

It seems important that the Executive Council continue this special legislative committee, with instructions to consider the actions taken by the district societies, and with discretionary power to formulate a bill which shall be approved by the regular legislative committee and presented at the next session of the legislature.

Present conditions seem to demand that protective laws be enacted, and, if they are necessary, care should be taken that they are justly framed. We must, however, not lose sight of the fact that law in itself does not promote either real efficiency or ethical practice. Before the enactment of any dental law, the public from necessity protected itself, and only the fittest survived. A college course is not a hardship, but the easiest way in which to obtain the knowledge that one must possess if he ranks high in professional attainments. College degrees which represent honest endeavor are a valuable asset; one cannot possess too many of these, but a degree obtained solely because the law demands it will act like a millstone, and tend to

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drag its possessor into the seething current of commercialism. Proper legislation should receive careful attention; but what is vastly more important is *efficiency*.

Statements which have seemed extravagant have been made in the past by men high in authority regarding fatalities and suffering caused by unskilful and dishonestly performed dental operations. And even worse than this is the neglect of the unfortunates who cannot pay for the services of the few who are skilful.

CO-OPERATION WITH THE MEDICAL PROFESSION URGED.

Today we face with humiliation the fact that these things and more are true. Large numbers of the medical profession are coming to realize that, without proper mouth conditions, they cannot produce and maintain health, and that the average dentist as well as the average physician is not alive to the significance of existing conditions.

The two professions are inevitably converging. Let us remove every obstacle from the path of progress of this convergence, for only by unity can the two professions attain the highest proficiency and give to humanity its due.

First, let us have done with petty jealousies and unreasoning contentions; then let us make ourselves worthy of recognition, and capable of intelligent argument by scientific and general advancement. The line of demarcation between the professions is a mirage, based on ignorance, which will vanish automatically as each approaches the other through the attainment of knowledge.

SCIENTIFIC RESEARCH.

There is a group of self-sacrificing men, unfortunately small at present, but growing larger every day, who by their skilful and patient efforts are endeavoring to place dentistry in the forefront of the learned professions. This group should be augmented by every capable and earnest worker; its individuals are deserving of the hearty admiration and unqualified support of everyone.

Dr. Weston A. Price has made contributions to both the medical and dental professions which are of inestimable value. His plans for the future will result in even greater accomplishments, if the work of the National Research Commission receives the support which it deserves.

There are men in our own state who are doing valuable research work. This work should be encouraged, and its scope extended by placing it in close harmony with the National Research Commisssion, so that its valuable results may be spread broadcast throughout the profession. The greater need today is not so much the education of the public as it is the education of the dentists themselves. In general, the thinking public is in advance of the dentist, and is demanding the care which only a few have the ability to give.

SUMMARY.

To summarize the foregoing suggestions, these recommendations are made:

(1) That a bulletin be published by this society, either annually or semi-annually, under the direction of the Executive Council, its details to be in the hands of a publication committee appointed by the Council.

(2) That section 4 of the By-laws be

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changed, providing that active membership may be held either in the society of the district in which one practices or of that in which he resides, and he shall not be an active member in more than one district.

(3) That the By-laws be changed so as to make it possible that the meetings of this society be held in some cities other than Albany, at the discretion of the Executive Council.

(4) That another office be created, such officer to be elected one year in advance of his term as active president.

(5) That the Necrology Committee be discontinued.

(6) That the By-laws be changed so that a recommendation presented without objection at the first session of the Executive Council may be acted upon at a meeting held not less than twenty-four hours subsequently.

(7) That the special Legislative Committee be continued during the current year, with instructions to consider the actions taken by the district societies, and with discretionary power to prepare a bill to be approved by the regular Legislative Committee and presented at the next session of the legislature.

We look with pride upon the achievements of this society. It has always maintained a high professional standard, and has not been lacking in constructive work. Stagnation at this time is inconceivable. The New York State Dental Society, with its district units working harmoniously, must and will advance.

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Report of the Committee on Practice.

By DANIEL H. SQUIRE, D.D.S., Buffalo.

AT the suggestion of your president it was deemed best to have the chairman of this committee edit the report and make it as short and concise as possible.

The section of scientific research is left out altogether because, in order to present new material, it would have been necessary to impose upon the generosity of the Committee on Scientific Research, and at best such a report would only be a repetition and a needless waste of valuable time.

The chairman sent out letters to every teacher of operative and prosthetic dentistry in this country and Canada, asking them what in their opinion had been developed during the past year that would be of permanent benefit to humanity. Replies were received from the following gentlemen:

Edwin T. Darby, University of Pennsylvania; John L. Forbes; Harvey L. Banzhaf, Marquette University; Edgar D. Coolidge, University of Illinois; E. E. Cruzen; W. E. Farris, Tufts College Dental School; Wm. P. Cooke, Harvard University; Clarence O. Wimpron, Washington University; Louis P. Hall, University of Michigan; Henry W. Morgan, Vanderbilt University; Austin L. Swift, New York College of Dental and Oral Surgery; H. M. Semans, Starling-Ohio Medical College; G. D. Laymon, Indiana Dental College; A. E. Webster, Royal College of Dental Surgeons; H. T. Smith, Ohio College of Dental Surgery; Wm. H. Porter; I. N. Broomell, Medico-Chirurgical College; Clyde Davis, Lincoln Dental College; Louis E. Ford, University of Southern California; Wm. F. Sharp, University of California; N. S. Hoff, University of Michigan; C. N. Johnson, Chicago College of Dental Surgery; G. S. Junkerman, Cincinnati College of Dental Surgery; F. H. Orton, University of Minnesota; S. H. Guilford, Philadelphia Dental College; B. Holly Smith, Baltimore College of Dental Surgery; Herbert L. Wheeler, College of Dental and Oral Surgery of New York; C. C. Allen, Kansas City Dental College; W. E. Cummer, Royal College of Dental Surgeons; A. H. Hipple, Creighton University; W. T. Chambers, Colorado Dental College; Alfred R. Starr, New York College of Dental Surgery; Chas. R. Turner, University of Pennsylvania; Geo. K. Thompson, Maritime Dental College, Dalhousie, Minn.; F. A. Ryan, Maritime Dental College; W. H. O. McGehee, Ohio Col-

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lege of Dental Surgery; H. E. Friesell, University of Pittsburgh; A. Hoffman, University of Buffalo; C. K. Buell, University of Buffalo; Ellison Hillyer, New York College of Dental Surgery; Donald M. Gallie, University of Illinois; Shirley W. Bowles, Georgetown University; H. B. Tileston, Louisville Dental College.

Their answers and those of the committee are tabulated according to their relative importance as received in the replies.

(1) *Operative dentistry.* (*a*) Prophylaxis, including pyorrhea alveolaris. (*b*) Synthetic cement. (*c*) Gold inlay. (*d*) Restoration of occlusal surfaces, tooth forms, and contact points. (*e*) Analgesia. (*f*) Radiography.

(2) *Prosthetic dentistry.* (*a*) Gysi articulator. (*b*) Williams' classification of tooth forms. (*c*) The Williams-Gysi artificial teeth. (*d*) Partial dentures retained by attachments—mechanical. (*e*) Green's method of taking inpressions. (*f*) Orthodontia.

(3) *Miscellaneous.* (*a*) The casting of aluminum dentures and of gold saddles as bases for prosthetic procedure. (*b*) Advanced work in plaster of Paris; the vulcanization of rubber as a contributing factor toward greater cleanliness. (*c*) Dr. Fischer's method of injection of novocain for local anesthesia. (*d*) Improvements in general anesthesia. (*e*) Removal of pus foci by extraction of teeth, by amputation of roots, and the refilling of pulp-canals. (*f*) The establishment of a bureau of research, revolutionizing the practice of dentistry. (*g*) The reorganization of the National Dental Society as improving the whole field of dental education. (*h*) Vaccines for the treatment of pyorrhea alveolaris. (*i*) Differential diagnosis of reflex pains in neuralgia of the trifacial nerve. (*j*) Extraction of the four first permanent molars, between the ages of ten and thirteen years, as a prophylactic measure in the elimination of decay when the pulps of these teeth are exposed—this to depend upon the physical advancement of the patient. (*k*) Reconsideration of the etiology of dental caries and a new theory of caries susceptibility by Kirk. (*l*) The co-operation of the general surgeon and the dentist in the discovery and diagnosis of precancerous lesions in the mouth. (*m*) The use of high-frequency current in the treatment of inflammations about the mouth, especially in pyorrhea alveolaris. (*n*) The progress made in the attribution to the changing constitution of the saliva as a factor contributing to the cause of caries. (*o*) Thorough cavity preparation. (*p*) Cataphoresis. (*q*) Contact with the student body. (*r*) Pickerill's theory of dental caries.

It is the purpose of your committee to discuss briefly only those subjects which have received more than passing mention, taking them up in the order of their benefit to dentistry. It is hoped, however, that any of the subjects which are placed in the miscellaneous column may be enlarged upon in either the formal or the general discussion.

While the items referred to are mentioned as being of the greatest value to the general health of the body, it is understood that none of them is of recent origin, but their development may have reached a very high plane during the past year, and in that sense have exerted an important influence in maintaining health.

ORAL PROPHYLAXIS.

Systematic cleansing of the teeth and of the oral cavity by means of careful

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brushing and the removal of all deposits which may harbor bacteria is one of the chief essentials of preventive medicine. When such an eminent surgeon as Dr. Mayo of Rochester, Minn., says that "preventive medicine lies in the hands of the dentist," the true significance of a clean mouth is apparent.

The increasing knowledge of the injurious effect of laceration of the septal tissues during operative work has done much toward maintaining the health of the gums and the peridental membrane. This is a step forward in preventing those diseases which have their origin in this location.

PYORRHEA ALVEOLARIS.

While a great deal of advancement may be recorded for the past year in the treatment of this condition, the attention of the profession should be directed to one fact, namely, that when the teeth are practically denuded of their peridental membrane and have lost the rigid support of the alveolar process they should be extracted. Splints applied to such cases as an aid in maintaining the teeth in the jaw are a menace to the health of the patient. In other words, the retention of these teeth by splint work creates a vast surface of denuded membrane which is exposed to the ingress of infectious bacteria. Allow me to quote from Dr. Noyes:

> It is important to remember that whenever the fibers have been stripped from the surface of the cementum, they can be reattached to it only by the formation of a new layer of cementum, building the fibers into it. This is certainly possible if the conditions are properly controlled, but the cells of the tissue must be in a normal and vitally active condition, and the surface of the root must be such that they can lie in physiological contact with it. The cure of a pyorrhea case, therefore, becomes a biological problem. In this connection it is important to remember that a surface of cementum which has long been bathed in pus may be so filled with poison that no cell can lie in contact with it and perform its function.

SYNTHETIC CEMENT.

The profession is more or less anxious in regard to the permanent qualities of synthetic cement as a filling material. It would seem that it is safe to use a reasonable amount of this cement in one's practice, but to exclude the other materials and to depend upon synthetic cement alone is not warranted at the present time. It harmonizes beautifully with the color of the teeth, and is especially favorably indicated in small cavities in the anterior teeth and in some very large cavities in teeth affected with senile decay; it is exceedingly important, however, to bear in mind the following:

(*a*) To thoroughly incorporate the powder in the liquid and to bring it to the proper consistence.

(*b*) To introduce it into the cavity in small pieces, until the anchorage grooves are securely filled.

(*c*) To use a short strip of celluloid —not more than one inch in length—in finishing.

(*d*) To allow the cement to crystallize thoroughly after its insertion, before coating it with paraffin and exposing it to the saliva.

(*e*) To finish the filling at a subsequent sitting.

COPPER CEMENT.

The colorless copper cement is an improvement over that which was made

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with the black oxid of copper, and in children's teeth, as well as in those of elderly people, the effect of this cement upon the tooth structure is of therapeutic value.

GOLD INLAY.

While the gold inlay is a valuable asset to the operator, yet this method should not be employed as a universal means of filling cavities with gold. In small approximo-occlusal, as well as in other cavities which are not large, the malleted gold filling is much more secure and of a higher grade of workmanship. The practical disuse of non-cohesive gold foils is to be deplored. It is of the greatest value in the form of mats or cylinders placed at the gingival seat of approximo-occlusal cavities, and in the shape of cylinders in filling small occlusal and buccal cavities, finishing the fillings in the former case with cohesive gold and in the latter case with or without cohesive gold foil. The method is rapid and the cavity is filled much more securely. There is a place for the inlay and a place for the malleted gold filling, and the operator who exercises judgment in the use of these methods will not meet with failure.

APPRECIATION OF OCCLUSAL RESTORATION.

The impetus which the essay by Dr. J. Lowe Young has given to dental operators in regard to the importance of anatomic restoration of oclusal surfaces has also done much in raising the standard of this class of operations, and in enabling the patients to masticate their food more properly. Some operators do not quite understand the application of this principle, because they attempt ideal occlusal restoration in mouths where the cusps are either much worn or entirely obliterated.

The correct anatomic feature in any case is one which harmonizes with the other teeth in the mouth. The full contour of the approximal surfaces with the properly made and placed contact point has been long recognized as an important factor in maintaining the health of the peridental membrane, and in enabling the patient properly to cleanse the teeth.

ANALGESIA.

The development of analgesia to a greater efficiency has been mentioned in the corespondence conducted by this committee. Upon inquiry in regard to the practical use of analgesia, the writer was informed that it is satisfactory in about five per cent. of cases. This would seem to be a rather low percentage, but by improved methods, we may some day be able to eliminate much of the pain connected with dental operations.

RADIOGRAPHY.

It is of vital importance that the profession should have the opportunity to use radiography to assist and verify the diagnosis of disease conditions. At the present time it is principally used by physicians, and the fee charged to dental patients is the same as that for a consultation—viz, ten dollars—for each radiograph. For the average dental practice this expense is prohibitive. It has occurred to the writer that if the colleges of this state would do such work for the profession in the districts in which they are located at a nominal price of two or three dollars per exposure, the situation would be relieved somewhat.

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The necessity for the co-operation of the surgeon and the dentist in the early diagnosis of malignant diseases is being more fully recognized. In this relationship the dentist has the opportunity of performing the greater service to the patient, viz, that of calling the attention of the individual to the condition before it is too late. The awakening of the profession to a realization of the susceptibility of the body to infection through neglect of chronic alveolar abscesses, open root-canals, and deep pyorrhea pockets about the necks of teeth has done much for the general health of the laity.

PROSTHETIC DENTISTRY.

The Gysi articulator. This instrument was so thoroughly discussed at the last meeting of this society that it needs only a word of commendation by those who have studied its merits. It is a revelation of accuracy in reproducing the various movements of the jaws. We shall not take the time to go into further discussion of its worth; it has been proved that a great advancement has been made in the construction of artificial dentures through the development of this articulator. The Gysi Adaptable is suited to the use of the thoughtful practitioner who is willing to devote sufficient time to master the manipulation of its parts.

Dr. Williams' classification of teeth. This theory has completely upset all previous ones in regard to the classification of the natural teeth and the manufacture of artificial substitutes.

Dr. Williams has undoubtedly proved that there is no such thing as temperamental forms of teeth; that there are no racial types of teeth; that nature does not always produce teeth which harmonize with the features and the face; that a scientific and artistic system of artificial teeth cannot be produced by copying sets of natural ones; and that there are three typal forms of incisors, as follows:

Class 1, characterized by parallel or nearly parallel lines which represent the proximal surfaces of these teeth for half or more than half of their length from the incisal edges.

Class 2. The parallel lines converge so markedly that they would meet in most instances at a point near the end of the root.

Class 3. This is known by a delicate, double-curved line on the disto-proximal surface and sometimes, though less frequently, on the mesial surface. All of the angles and surfaces of this class are more rounded and graceful.

"These primitive forms of teeth," says Dr. Williams, "are the same in different races, and this proved fact not only disproves a racial type of tooth, but it proves beyond question that there is no such thing as a temperamental type."

After an exhaustive study of the teeth of many skulls of nearly all races, even going back to the Bronze age, Dr. Williams makes this statement in regard to the harmony of the teeth and the face: "It would probably express an important truth to say that Nature always seems to be striving to reach or realize harmony, but rarely achieving a perfect success and sometimes going very wide of the mark." And again, "Any given forms of teeth are not peculiar to any race, neither do they bear any necessary relation to the shape and size of the skull. In all races there is community of typal tooth forms."

Williams-Gysi artificial teeth. Permit me to quote again from Dr. Williams' paper in order to show the underlying principles which inspired the creation of the Truebite anatomic molds: "While all art must be founded on the most in-

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timate, penetrating, and thorough study of nature, that it may be true to life, yet truth to life means much more than an indiscriminate consideration and an acceptance of a mere welter of facts. It means the appreciation and understanding of the relative value of facts and the power or faculty of discriminating between what is of small value and what is important, relevant, and fine—all that is really vital to the subject."

Dr. Williams declares that there are comparatively few forms of artificial teeth required, because there are only a few types of human faces. "The aim in designing artificial teeth should always be to maintain character in the tooth by keeping its typal or class features dominant. The object is to establish harmony between the outline or form of a tooth and the outline or form of the face. If the lines and curves of the tooth balance or are in harmony with the lines and the curves of the face, the highest degree of perfection attainable has been reached. The application of the three typal classes of teeth to the three types of faces are thus a harmonizing blending of the two."

Some of the features of the new molds. The enamel markings on the labial surfaces diffuse the light and soften and enhance the appearance of these teeth.

The tiny horizontal striations prohibit the reflection of light in solid blocks, thus softening both the high lights and the shadows. The occlusal surfaces of the bicuspids and molars which are designed by Dr. Gysi are so formed that the food is properly prepared by a triturating force of from 15 to 20 pounds. Professor Gysi has also joined the two bicuspids and the two molars on each side in the form of a single block. The compensating and lateral curves are accurately worked out in the occlusal surfaces of these blocks, so that their antagonization in full sets is very simply made.

Classification of the human face. Class I comprises the square type of face, in which the sides are parallel or nearly so, and in which the curves at the angles of the jaw are so abrupt as to give the face a square appearance. This type of face, with its variations in length and width, harmonizes with the outlines of the teeth of class I. Class II is the pyramidal or tapering face, in which the forehead is very broad, with the outlines of the face converging toward the chin; the class II molds are especially adapted to this type of face. Class III is the ovoid face, which has the greatest width in the lower part, the outline frequently exhibiting compound curves; the class III mold is designed for this type of face.

Partial dentures retained by attachments—mechanical. The profession is slowly but surely abandoning the practice of inserting large pieces of bridge work. The partial denture with a palatal or a lingual bar, held in position by some removable attachment, as designed by Gilmore and others, had proved itself to be just as serviceable and much more hygienic. In cases where the roots must be made parallel to receive attachments the parallelometer designed by Dr. Chayes is indispensable.

The Green method of taking impressions. This method differs from those heretofore in vogue in the following respects: Small trays of aluminum with removable handles are used instead of the large, heavy trays. The trays are trimmed to clear the muscle attachments of either jaw from one-eighth to three-sixteenths of an inch or more, so that the tray cannot interfere with the press-

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ing of the impression compound against the ridges; the tray is then filled with one-third or one-half sheet of impression compound. In the upper tray the compound is heaped high in the center, in the lower it is laid on the tray in the form of a roll of about the size of a lead pencil. The loaded tray is passed into the mouth, pressure being exerted at right angles to the surface, held in the mouth until the compound has cooled, then removed, chilled with water, and the excess of compound, if there be any, is trimmed away.

The muscles are made to conform to the periphery of the impression as follows: The outer border of the impression is heated to a slight degree over a dry flame, passed into hot water, thence quickly into the mouth. The patient should then be instructed to move the lips in every direction possible, thereby shaping the softened surface to conform to the pressure of these muscles.

The heel of the plate may be forced to lie tightly in contact with the palate by heating the margin slightly and returning the impression to the mouth, and while holding it firmly in position, the pliable margin is forced against the roof of the mouth by a wiping pressure with the index finger.

ORTHODONTIA.

The new expansion arches devised by Angle allow periods of rest between the movements of the teeth. The patient does not need to appear for treatment as often as formerly, and the improvement in the making of these orthodontic appliances has reduced the liability to caries during treatment to a minimum.

THE SALIVA.

This most important subject will no doubt be fully discussed in the report of the Committee on Scientific Research, and, in passing, this committee most heartily commends the excellent work which is being done by Professor Gies and others in determining its influence upon the inception of dental caries.

Respectfully submitted,

DANIEL H. SQUIRE, *Chairman,*
FRANK F. HAWKINS,
WILLIAM J. LEDERER,
Committee.

DISCUSSION.

Dr. W. S. ROSE, Schenectady. Although the report of the Committee on Practice came into my hands but yesterday, I have had it long enough to note that it is an unusually able and accurate report of those features which are receiving the attention of the leaders in dental practice. This is assured by the communication of the Chairman with forty-two of our dental college teachers. The fact that twenty-nine topics are cited in their replies gives us some idea of the vast extent of our efforts. If forty-two other leaders outside the colleges had been consulted, there would doubtless have been a liberal addition to the subjects for consideration.

I am glad that this report concerns

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practice instead of theory; not that the latter is not important, for I believe the topic cited by one correspondent, "The Establishment of a Bureau of Research," is the most gratifying fruit of our newly consolidated organization, to be not eclipsed in importance by any other phase of our professional activities. But what we need as a profession is the emphasis of the importance of *practice* rather than *preaching*. There are so many dental journals and so many ambitious dentists, whose literary productions need encouraging but whose efforts from a scientific standpoint are utterly insignificant when compared with the demonstrated achievements of our great men—Black, Miller, Gysi, Snow, and others. So much is being written that the rank and file of dentists, who are busy practitioners, too busy to read all the essays that appear, become confused as to which is the important and proved, and which is the speculative. Not long ago some dentists at a district meeting were discussing the insertion of amalgam, and a number of the members recommended the plan of burnishing amalgam into the cavity, when for the last decade no practitioner who has been regarded as sufficiently proficient in the use of amalgam to place a set of instruments on the market has included an amalgam ball burnisher in his set.

Notwithstanding the fact that Miller settled for all time to come the cause of the so-called erosion at the necks of teeth, and demonstrated that the responsibility for these defects lies with the powder and brush; notwithstanding the fact that no one has ever seen a case of erosion in neglected, unbrushed teeth, papers are still being written reviving this question and discussing the etiology, by men who have never even read Miller's discourse on the subject.

Although for more than a decade no writer bold enough to place a text-book upon the market has advocated any other method of cavity preparation than that evolved by G. V. Black, there are still good operators who regard the disciples of his scientific methods as mere faddists.

When such men as Dr. Mayo, whom Dr. Squire quoted, admit and assert that "preventive medicine lies in the hands of the dentist," it surely behooves us to so classify our achievements and standardize our accepted methods that we are at least ready in the cause of humanity to utilize the conquests that cost our scientific investigators so much. If there were monetary conditions attached to their use, we would contest the validity of the royalty, and proceed with their use until the case were settled.

Although the report of the committee is short, it is full of meat. The paragraphs dealing with pyorrhea alveolaris and the elimination of oral septic foci show that good work is being done to eradicate the stigma attached by medical men to our efforts. It seems that the time has arrived when those dentists who do not believe in fighting these conditions are limited in number. I want very much to hear an epitome of the results of the experiences encountered in the use of synthetic cements. I know some patients who prefer it to porcelain at the same price. It certainly lends itself beautifully to the selection of perfect color.

The regret of the committee that soft foil is not used as much as of yore is apparently being shared by most good operators. More clinics demonstrating its use have been given of late than

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formerly. Certainly the dentist who does not use soft foil is doing himself the greatest harm imaginable.

I should like to hear a great deal about analgesia. I believe the essayist underestimates considerably the percentage of success in its use.

The paragraph on radiography is to the point, and has one's ready indorsement.

The part of the report devoted to anatomical occlusion and forms of teeth, as well as impression taking, deserves special commendation. I never could learn the directions as to temperamental forms of teeth, and now I am overjoyed that this classification has been found unreliable.

The brief description of the Green method of impression-taking is very valuable. It seems that, after a good impression has been taken, some improvement should be noted when it is duplicated in the denture. Every dentist has replaced an impression in the mouth, pulled with considerable effort in order to dislodge it, and then was saddened by the thought that the finished denture would be dislodged by less than one-half that effort. Have any marked results been obtained by the use of the approximate metal forms now on the market?

Dr. W. A. PRICE, Cleveland, Ohio. I am glad to have heard the report, which I consider to be one of the best summaries on the present status of our professional work, particularly with reference to research work.

I am unable to enter into a discussion of this subject without becoming so enthusiastic that I might embarrass this occasion. I particularly want to emphasize that portion of the report which recommends more exact knowledge. I think I voice the sentiment of every man here when I state that the greatest need of dentistry today is truth.

Dr. C. N. JOHNSON, Chicago. I had no idea of taking any part in the discussion of this excellent report, but it is a great pleasure to commend it and to signify my approval of its salient features. There are just two subjects that I want to refer to briefly, if I may, and if I misquote the report I should like Dr. Squire to correct me. The report speaks of analgesia. That seems to be the prominent subject before the profession at this time, and I think Dr. Squire made the statement that, judging from the report referred to him, about five per cent. of cases were supposed to be successful. Is that correct?

Dr. SQUIRE. Yes.

Dr. JOHNSON. I believe that part of that five per cent. is successful in the mind of the operator and the patient rather than from any virtue of the process. [Applause.] I do not want to appear iconoclastic, but I have been sufficiently long in the profession to see many innovations introduced which met with enthusiastic reception at the moment of their introduction, but after calm deliberation as to results, we have usually returned to the old methods of practice, and dropped many of these new fads. I want to make a statement here lest I may be misunderstood in some of the remarks I wish to make. There is no member of the profession who has greater respect for the sensitivity of the patient than I. No man could go farther than I to alleviate suffering in the dental chair, but I do not believe that analgesia is the best way to meet the situation. I do not believe that all of the discomfort experienced in the dental chair is physical. The pain we inflict upon patients is of such a character that

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it is necessary to render the patient insensible or partially insensible to accomplish the results we are called upon to accomplish. And, in my belief, the introduction of any such means is demoralizing to the profession. If we treat patients with kindness—I know this is old, but it is admirable nevertheless—and impress them that we are trying to minimize their discomfort, they will meet us halfway and tolerate any reasonable measure of discomfort. The profession should not foster in the patients' minds the idea that, when they come to the dental office, they need not have some stamina to tolerate the operation. The principal pain that we cause to patients is in the preparation of cavities, but my patients complain of other operations as much as of the preparation of cavities. The application of the rubber dam, the buzz of the engine, the polishing of fillings—all these necessary procedures jar on their nerves as much as the preparation of cavities, and if a cavity is so extremely sensitive that we cannot adequately prepare it for a permanent filling, I believe the best service will be rendered by the insertion of a temporary filling, oxyphosphate if you wish. It would be a mistake, of course, to dismiss the patient with the idea that the filling is permanent; on the contrary, a time should be specified for his return, when the operator will be able to make a preparation that will not be irksome to the patient at all. [Applause.] I do not want to discourage any effort to alleviate suffering, but I have had experience with patients who came from practitioners who have impressed the necessity for humanitarian dentistry on them, and in nearly every case these were the most nervous patients, and the most difficult to deal with. Their fear had not been eliminated by analgesia or cataphoresis, as practiced quite extensively a few years ago. I do not believe in inflicting any more pain than is necessary, but we should develop that particular stamina in our patients which enables them to withstand the discomforts incident to legitimate practice, and not develop that dependence which makes patients come to the office and ask for narcotics every time they take the chair. I do not believe that it is well for the tissues from a physiological point of view to carry them to the point of insensitivity by means of an anesthetic and to keep them in that condition, for even half an hour.

Reference has been made in the report to the advocacy of the extraction of the first permanent molar under certain conditions.

Dr. SQUIRE. That procedure was advocated by one of the correspondents quoted in the report; it was not advocated at all by the committee.

Dr. JOHNSON. I did not believe that with the present enlightenment upon the importance of the first permanent molar, any practitioner could still advise its extraction. To my mind, the first permanent molar is the most important tooth in the whole arch, upper and lower. [Applause.] There is no other tooth which so securely maintains the arches in normal relation to one another. I have examined a great many models, but have never seen one in which the occlusion was normal after the extraction of the first permanent molar. I believe we should preach this in season and out of season to the young man coming into the profession. We may not be able to reform the old practitioner, because he is set in his way and I respect his way no matter what he does, but upon the young men we should impress the fact that

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that tooth above all others should be preserved in the arches in order to insure normal occlusion. That message must be carried not only to the profession but to the public at large. No practitioner should give a public lecture without emphasizing that fact, so that the mothers will be able to recognize the first permanent molar in the mouths of the children, and be sure that it is preserved. I need not go into the reasons why it should be preserved, but I never like to see even a reference made by a dental practitioner as to the advisability of its extraction.

Dr. C. F. Ash, New York. It had not been my intention to take any part in the discussion of the report, but I feel I should be doing less than my duty if I failed to make some remarks just now. Dr. Price has said that what our profession is seeking for is truth in dentistry, and it is with that statement ringing in my ears that I feel impelled to make reply to part of the discussion made by Dr. Johnson. I know that it requires a good deal of temerity to take issue with any statement on any phase of the practice of dentistry by so eminent a man as Dr. Johnson. What I wish to say concerns the question of analgesia. I was impressed with the report made by your committee, viz, that possibly five per cent. of the analgesia operations are successful. I was surprised at this small percentage, and I was still more surprised by Dr. Johnson's subsequent remarks. Dr. Johnson said that he was heartily in sympathy with any effort to alleviate pain, but stated that, in his mind, it was detrimental to the tooth physiologically and to the mental condition of the patient to give the patient an anesthetic. It may be that the period within which nitrous oxid and oxygen has been used has been so short that we are not prepared to say what the physiological and mental effects may be. It may require some years of development to discover that there is a detrimental effect, but I must say that up to this period I have been unable so far to detect any detrimental effect either mentally or physically upon any patients upon whom I have used this anesthetic in my office. I feel sure that Dr. Johnson's experience is based not upon his own efforts but upon those of other practitioners who have been unsuccessful with nitrous oxid and oxygen analgesia.

My experience with cataphoresis some years ago was not altogether a happy one. I had a cataphoric apparatus and used it quite extensively until I felt that, in my hands, it was not satisfactory, and I discarded it. From my own experience I felt certain that the administration of nitrous oxid and oxygen is satisfactory in the hands of some practitioners at least, and I do not pretend to be specially capable in manipulating the anesthetic. Patients are relieved of a great deal of anxiety and pain by analgesia, and some operations which formerly I could not perform without some other anesthetic are possible with this method. I do not use it on every patient, any more than I perform the same operation upon every patient, but restrict its application to cases in which I expect the pain to be so great as to warrant the use of some analgesic. These remarks are not made in a spirit of antagonism to either Dr. Johnson or the committee, but simply in the interest of truth. [Applause.]

Dr. Henry W. Gillett, New York. Having discussed the report of the Correspondent a year ago in regard to the radiograph, I want to say a word upon

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this subject, as it has been referred to in this report. Another year's experience has confirmed my position and views; so much so that I am now even a stronger advocate of the constant use of the radiograph in the dental office than I was then. I believe that it is more essential in dentistry than in any other branch of the healing art for the operator to have an X-ray apparatus in his office where he can make use of it at will during the progress of operations. Reference was made to the expense. I deplore the fact that the question of expense in that connection has been raised here as elsewhere. Perhaps I am influenced by a report which recently appeared in the *Dental Cosmos* of the remarks of a member of this society, who was evidently referring to my discussion of a year ago, and who, in my opinion, assumed a somewhat unfair view. Possibly he was joking when he suggested that the practitioner who used the radiograph to the degree that I advocated a year ago was possibly doing it because of the money returns in it. It seems to me that this is not the right attitude. The point of my argument was that the patient receives much more than the equivalent value of the added expenditure incident to the use of the radiograph by the much greater value of the service received. One of our New York practitioners who has been making use of the radiograph in his practice for several years has reported recently that careful analysis of the expenditures connected with that work shows that radiographs in his office cost twelve cents apiece, exclusive of the expenditure of time. It is coming to be the opinion of many men who use the radiograph freely that it is not wise or fair for the general practitioner of dentistry to charge specialists' fees. I may say that some of us are charging a fair fee for the first radiograph, but make no further charge for radiographs of the same tooth, regardless of whether it is radiographed once or twenty times; others are adopting modifications of that plan. In my estimation, the question of the fee of the specialist in radiography does need to be raised here. The fee that is fair in a large city is unfair in a smaller town where expenses are much less. But regardless of the amount of the fee, there is an equivalent value for the patient to be gained by the use of the radiograph, and this value is often much greater than the expenditure. I want to reiterate my statement made last year with regard to the importance of the radiograph in dental practice, viz, that no man who desires to practice dentistry on the highest plane can afford to dispense with the constant assistance of the radiograph.

Dr. SQUIRE (closing the discussion). I shall only say a few words in closing this discussion. In regard to the synthetic cement, I think the letter I received from Dr. Darby expresses the idea quite clearly. He said, "We do not know just what to say about synthetic cement. . . . . While it is a beautiful filling material, I think we should go carefully, and work out our own salvation."

The extraction of the first permanent molar, which Dr. Johnson spoke about, was neither recommended nor indorsed by the committee; it was simply one answer I received from a gentleman connected with one of the leading colleges of the country in regard to what he thought was the correct method. He stated further that he would in the future demonstrate to the profession by means of a great number of models that

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his contention was correct. We have simply reported this man's opinion for what it is worth.

The expense of radiography was spoken of, because in Buffalo they charge a consultation fee of ten dollars. As many of us know, that price in a great many cases is simply prohibitive. I realize the importance of this method of diagnosis in general practice, but many times when a patient has to be subjected to four or five, and possibly more exposures, the price of ten dollars for each radiograph is unreasonable. If one owns an apparatus, I appreciate the fact that the expense is little, but it is difficult to induce practitioners who are located in small communities to buy an outfit. Therefore I wish that some means could be devised to place such outfits in their hands, and that was the object of the committee's reference to this topic.

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Municipal Control of Dental Clinics.

By John J. CRONIN, M.D., New York, N. Y.,
ASSISTANT DIRECTOR, BUREAU OF CHILD HYGIENE, NEW YORK CITY.

IT is said that public health is a purchasable quantity and that a community may, within reasonable limits, determine its own death-rate or community health. From a business standpoint, it is urgent that any community determine—taking into account its financial condition—what portal of disease is the proper one to control.

Purchasing public health means efficient concentration. Most communities waste whatever appropriation may be made in the interest of public health. After a year's endeavor there is no concrete measurable quantity which a wasteful community may produce as a positive asset in its endeavor to obtain a larger appropriation for the extension of its work.

If the authorities in charge of the appropriation would use the money in a concentrated effort to cover efficiently one field, or such proportion of one field as the amount of funds allows, it would be possible to produce a positive statement of fact, and put the responsibility of sufficient funds to control all fields squarely up to those guarding the grant of appropriation.

If the needs of a community are known and stated, and a statement of fact is made that with the present allowance of funds the community is able to attack and care for only 10 per cent. of its needs, either it is absurd, ridiculous, and wasteful to grant the present funds, or it is necessary, proper, and economic to grant a sum sufficient to care for all the needy and not for a very small proportion. New York is the most progressive and liberal city in the world in the matter of conserving the health of its inhabitants. The experience of New York may be used as an illustration of the periods of development of a preventive measure for public health.

DEVELOPMENT OF ORAL HYGIENE MEASURES IN NEW YORK CITY.

The gross sum of money allowed the department of Health to conserve child life is $651,195. Of this sum, $496,394.23 is used for medical inspection of schools, care of foundlings, supervision of midwives, day nurseries, and institutions, issuing of employment certificates, and for children's clinics and hospitals;

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$140,787.26 is used for milk stations or the work of reducing the mortality rate among infants. The actual cost of clinics and hospitals is $77,425.81. The dental service costs approximately: 1 supervising dentist, $1500; 9 dentists, at $1200, $10,800; equipment and apparatus, $3500; current expenses, $2500; nursing service, $4500.

When the clinics were opened, there was little knowledge about our ability to furnish a *clientèle*. Within a month the fear of an insufficient *clientèle* was supplanted by a horror of the inadequacy of the service. Appointments were made, and those who came first were given the preference. This method continued for about eight months, and brought us to the period when we must estimate our needs for the new budget. We who were actively engaged in the work knew how important our needs were, but when we attempted to tabulate and show as a definite asset what we had done, how much there was to be accomplished, and then how much could not be attempted, we were not able to present our facts in a thoroughly businesslike way. The reason was that our efforts were spread over such a great area that their results, from a practical and demonstrable standpoint, were lost. Wherefore the director of the bureau of Child Hygiene advised limiting our efforts to certain schools in the neighborhood of the clinics, and caring for the children of the first and second year classes in these schools. At the end of a given period under this plan we had very positive data, that allowed of drawing undeniable conclusions.

METHOD OF SELECTION OF WORTHY CASES FOR DENTAL DISPENSARY WORK.

The method of obtaining the children for the clinics is as follows: A nurse is specially detailed for afternoon service, and she collects the children at the school, takes them to the dental clinics, and also returns them to their homes. Appointments are made so that those children who have received treatment return until they are discharged as cured. The usual precautions against imposition in regard to free dispensary work obtains, and I believe that the city of New York exerts a most ideal control. The teacher of the class knows the financial and social status of the family; the school nurse knows about the home conditions, and she must not send any child to the clinic unless the case be a worthy one; the registrar at the clinic will not receive any child for treatment unless the child presents a card signed by the school nurse, and a consent card signed by the parent.

TABULATED RESULTS OF THE YEAR OF 1913.

Merely from a municipal economic standpoint, a glance at the following table will show the value of the work to the city, and the work accomplished by the department clinics during the year 1913:

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YEAR ENDING DECEMBER 31, 1913.

Dental Clinics.

	121st st.	Second ave.	169th st.	Herk. st.	Throop ave.	Lawrence st.	Bay st.	Total
No. registered	*1,867	1,478	900	769	1,161	887	205	7,267
Male	*691	715	351	370	515	460	**	3,102
Female	*868	763	549	399	646	427	**	3,652
Revisits	3,729	4,452	1,693	881	661	2,493	**	13,909
Total visits to dispensary	5,503	5,930	2,593	1,650	1,822	3,380		20,878
No. discharged	1,045	1,433	892	750	878	695	80	5,773
" cured	872	693	601	380	796	496	59	3,897
" dropped	173	740	291	370	82	199	21	1,876
No. treatments ...	15,918	10,025	7,902	6,921	4,818	7,198	291	53,073
No. fillings	6,279	4,412	2,698	2,711	1,846	3,784	159	21,889
temporary	1,168	1,109	400	976	267	1,222	51	5,193
permanent	5,111	3,303	2,298	1,735	1,579	2,562	108	16,696
No. extractions ...	3,270	2,347	1,778	1,525	1,702	1,944	394	12,960
temporary	2,741	1,951	1,439	1,234	1,337	1,450	286	10,438
permanent	529	396	339	291	365	494	108	2,522
Cleanings	199	60	12	244	107	91	—	713
Abscesses lanced ..	—	42	38	7	—	—	—	87

* Discrepancy in figures owing to lack of complete records for the first part of the year.
** Record of this not kept for the first part of the year.

EFFECT OF DENTAL DISEASE ON SCHOOL ATTENDANCE.

The cost of educating a child is about twenty cents a day. The following table shows the number of absences due to toothache or allied mouth trouble during the months of January and February among children with and without dental treatment:

Registration.

Class.	P. S. 122.	P. S. 63.
1A	314	121
1B	136	144
2A	181	133
2B	187	175
	818	573

NOTE.—In P. S. 122, 20 per cent. of the absences occur in those who received dental treatment, as compared with 45 per cent. absences among those who did not receive dental treatment.

	P. S. 122.		P. S. 63.	
Attended dental clinic	362	403	27	134
Attended private dentist	41		107	
Not receiving dental treatment	415		439	
Absentees receiving dental care	156=39 per cent.		89	
Absentees not receiving dental care	389=94 per cent.		243	

THE ECONOMIC PHASE OF ORAL HYGIENE.

If the same value obtains throughout the year, the loss of money to the city is an enormous sum. Considering that eight years is the limit that most children spend in school to qualify for provident citizenship and that anything that interferes with this time is a loss to the individual, the probable cost to the city

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in caring for irresponsibles is appalling. Children with bad teeth and bad mouth hygiene are the ones who most surely contract contagious diseases—scarlet fever, measles, diphtheria—and it is interesting to consider the numbers who would have escaped if their oral conditions had been sound and healthy. The difference represents a real financial loss; the loss in future morale is even more.

Medical men need no proof of these conditions. We know in our own practice that certain children do not contract contagious diseases, because they are physically normal. If the proper repair of teeth will prevent contagion, what a saving it would be to assure adequate dental service! Children in the early stages of tuberculosis are not admitted to the preventoria until the teeth and mouth are in good, wholesome condition. "There is no single factor that so impoverishes a community as disease, and there is no single portal that so greatly predisposes to disease as bad teeth and bad oral hygiene." The conclusion, therefore, seems inevitable that, if a community seriously wishes to rid itself of the stigma of a high incidence of contagious cases, it must provide for a proper oral hygiene education of children in the homes and in the schools. Tooth-brush drills and hygiene leagues are valuable factors in schools. Mouth hygiene must be considered as a routine procedure, and children constantly advised to brush their teeth. The following circular is issued by the department:

DEPARTMENT OF HEALTH

CITY OF NEW YORK

DIVISION OF CHILD HYGIENE.

Instructions to Parents Regarding the Care of the Mouth and Teeth.

The physical examination of school children shows that in many instances the teeth are in a decayed and unhealthy condition.

Decayed teeth cause an unclean mouth. Toothache and disease of the gums may result.

Neglect of the first teeth is a frequent cause of decay of the second teeth.

If a child has decayed teeth, it cannot properly chew its food. Improperly chewed food and an unclean mouth cause bad digestion, and consequently poor general health.

If a child is not in good health, it cannot keep up with its studies in school. It is more likely to contract any contagious disease, and it has not the proper chance to grow into a robust, healthy adult.

If the Child's Teeth Are Decayed, It Should Be Taken to a Dentist AT ONCE.

The teeth should be brushed after each meal, using a tooth-brush and tooth-powder.

The following tooth-powder is recommended: Two ounces powdered precipitated chalk; half-ounce powdered Castile soap; one dram powdered orris root; thoroughly mix.

This prescription can be filled by any druggist at a cost not to exceed fifteen cents.

The child should take the tooth-brush and powder to the school, and receive instructions from the nurse as to their proper use.

The department of Health maintains at the following addresses dental clinics for the treatment of school children:

Borough of Manhattan—449 E. 121st st., 164 Second ave.

Borough of Brooklyn—330 Throop ave., 124 Lawrence st., 1249 Herkimer st.

Borough of The Bronx—580 E. 169th st.

[Issued by order of the Board of Health.]

The following is a report on the first free dental clinic:

[DIVISION OF CHILD HYGIENE.]

A FREE DENTAL CLINIC FOR SCHOOL CHILDREN.

The medical inspection of school children in New York city has shown clearly that in one direction at least the facilities for treatment, either free or at a nominal cost, are absolutely deficient. The city is fairly well supplied with dispensaries and hospitals where the poor may obtain free medical or surgical care, although there are still certain districts in the city, notably those not densely populated, where facilities of this kind are not adequate. When the family is able to pay a small fee for medical services, physicians can usually be found who will give an adequate return in treatment, but the average fee for competent dental care is above the means of a great proportion of the people, and free dental clinics are the exception.

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During 1910, out of 266,426 children examined in the public schools, 94,630 were found to have defective temporary teeth, while 69,620 had more or less serious defects of the permanent teeth. Inspections for these defects were made by physicians, but it is probable that many minor cavities were overlooked, as the schools are not equipped with facilities for complete dental examinations.

A special examination made by a dentist of 500 children between the ages of fourteen and sixteen years who were applicants for working papers at the department showed that 495 were in need of dental care. It is unusual to find a child under the age of ten years who has not one or more defective teeth, while above that age the defects are almost equally prevalent. It may safely be assumed that every child of school age needs dental supervision, if not actual dental treatment.

To meet this situation, New York city has in all of its boroughs eighteen dental clinics. Three of these, maintained by the Children's Aid Society, are kept fully employed by the care of the teeth of the children attending the society's schools. Fourteen of the clinics are connected with general dispensaries or dental colleges, and treat adults as well as children. The remaining one devotes its services exclusively to children from the public schools.

Some few public-spirited dentists have volunteered to treat school children free on one or two afternoons a week, and their services are greatly appreciated by the department.

It may readily be seen that there are great difficulties in the way of obtaining proper dental care for children whose parents are totally unable to pay anything, or those who, at the best, can pay but a small fee. As corrective treatment is so difficult to obtain, the department has felt the necessity of confining its main efforts to the question of preventive treatment, and for the past two years all of the children found with defects of the temporary teeth have been instructed in the hygienic care of the mouth and teeth by the nurses from the department of Health. Each child is required to obtain a tooth-brush and tooth-powder and to bring them to the school, where their use is demonstrated by the nurse. The children are assembled in groups, and regular "tooth-brush drills" are held. Repeated reinspections are made by the nurse, both at the school and at the children's homes, to see that instructions are obeyed. For defects of the permanent teeth visits are made to the home of the child, and regular dental treatment urged. Notwithstanding the most strenuous efforts in this direction during 1910 but 26,175 or 37.6% received regular dental care. Each child found with defective teeth is given a copy of the following circular. [See preceding page.]

On January 15, 1910, the first free dental clinic exclusively for school children to be established in New York City was opened at 449 E. 121st st., Borough of Manhattan, as a result of the efforts of the Honorable Peter T. Barlow and a number of his friends. The entire amount of money needed to equip and maintain this clinic was contributed with the understanding that the department of Health should detail a nurse to have general supervision over the children, and that only those children should be treated who attended the public schools, and whose parents were too poor to pay for the treatment. Applicants are visited at their homes by the nurse, who investigates the financial status of the family and determines whether or not free treatment is justifiable. The nurse also assists the dentists during the treatment hours and keeps all cases under supervision to see that the children return regularly for treatment, and that they are thoroughly instructed in the care of the mouth and teeth.

The clinic proper occupies two rooms, one of which is used for the patients who are waiting for examinations or treatment and the other equipped with the necessary appliances, including two dental chairs. Two dentists are regularly employed, and they are both on duty every afternoon from Monday to Friday inclusive, and on Saturday mornings.

The following is a report of the first year's work:

TOTAL COST OF EQUIPMENT AND MAINTENANCE JANUARY 15, 1910, TO JANUARY 15, 1911.

Dental equipment and furniture .		$383.40
Dental supplies		746.21
Rent	$564.50	
Wages	222.50	
Coal, water, insurance, lighting and telephone..	213.05	
Printing and stationery ..	103.99	
Repairs and sundries	205.16	
Salaries of dentists	1,292.50	
Salary of nurse	900.00	
Permanent installation ..		$1,129.61
Running expenses	3,501.70	3,501.70
Total expense		$4,631.31

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WORK PERFORMED FROM JANUARY 15, 1910, TO JANUARY 15, 1911.

No. of children treated	1,129
No. of treatments	5,925
No. of fillings	4,861
(root canals 764)	
No. of extractions	1,499
(temporary 927)	
No. of cleanings	469

Each child treated had its teeth put in perfect dental condition before it was discharged.

An analysis of these figures will show that, deducting the cost of installation which, with slight depreciation in value, will be permanent, the average cost of complete dental treatment for each child was $3.10. Including equipment, the average cost per capita was $4.10.

The cases varied in severity, but the majority were extreme cases of neglect. The average of over four fillings and one extraction for each child gives an indication of the conditions met.

Neglect of the care of the teeth in childhood, with the resultant malformations of the jaw and often loss of the teeth themselves, is undoubtedly one of the causes of impaired physical efficiency throughout life. The conditions in this regard existing among the school children of New York city at the present time warrant serious consideration. The presence of decayed teeth means improper mastication of the food, and the child suffers consequently from indigestion and resultant malnutrition and anemia. Unclean mouths and decayed teeth act as breeding-places for many forms of pathogenic bacteria, and the liability to contract contagious disease is greatly increased. As a result of decayed teeth we often find enlarged and sometimes suppurating cervical glands. Local pain and discomfort, with many other abnormal physical symptoms and conditions, can often be traced directly to this source.

The practical results of this condition upon the school progress of the child is worth considering. There is a distinct loss of time in school, due to local pain and discomfort and to the many diseases which find their starting-point in the neglect of the mouth and teeth.

Dr. Leonard Ayres of the Russell Sage Foundation has made a tabulation of the records of the physical examinations of 7,608 children who had been examined by the inspectors of the division of Child Hygiene. He found that children with defective teeth progressed 6 per cent. more slowly in their school grades than normal children, and that whereas the average child with no defects completed eight grades in eight years, the average child with defective teeth took 8.5 years to complete the same course.

The establishment of the free dental clinic for school children is a splendid example of true civic helpfulness. It is probable that in the establishment of more clinics of this nature a certain proportion can be made either entirely or partially self-supporting.

The people of this city owe a debt of gratitude to the generous men and women who have supported this clinic, and the results of their efforts are worthy of serious consideration by all who are interested in the welfare of children.

CONCLUSION.

A clean mouth means clean teeth and clean throat; these in turn mean a clean mind and body. With this healthy combination assured to every child, we need not fear for the continued welfare of the nation.

DISCUSSION.

Dr. H. L. WHEELER, New York. I wish first to express my appreciation and that of the society of Dr. Cronin's valuable paper, and of the courtesy of Dr. Goldwater, who is the health commissioner of New York, in sending him here. I trust that Dr. Cronin will be able to have sent, to the members of the dental profession who wish them, copies of the monthly *Bulletin* of the New York

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City department of Health, which will keep them posted on the progress of the various services, including the dental department, carried on in New York City. If the dentists were posted on these activities, perhaps their enthusiasm would be greater, although I think it is very satisfactory now. This most interesting paper has dealt exclusively with the work of the division of Child Hygiene, and I wish to call attention to the fact that when dental service was established in the New York City department of Health, we did not stop with the care of the children, although that is the most important feature and received the largest grant of money and the greatest amount of service; but in order to be thorough and complete, the division of communicable diseases had a dentist connected with it, so that those unfortunates who were attacked by tuberculosis and other diseases, and who had to be sent away for preventive treatment, might, among other things, have their mouths put in a thoroughly hygienic condition before going away to seek health. I have here a report of the work that has been done in that department. During the year one dentist attended to 2372 cases, 2066 of which went to the Otisville preventorium managed by New York. I mention these figures in order to show how thoroughly the department of Health of New York City has gone into this matter. What is really needed now is extension of the service. Dr. Cronin did not tell you that seven years ago forty per cent. of the children in New York City were retarded in their advancement in the public schools because of physical defects, and after seven years' work by the division of Child Hygiene, this percentage has been reduced to eighteen per cent., showing what can be done in this work. To make the figures more concrete, there are about 700,000 or a little more public school children in New York City, and according to statistics, about eighteen per cent. of these are retarded or become "repeaters" because of physical defects; in other words, about 140,000 public school children in New York City are unable to go forward to the grade expected of them, or remain in the grade in which they have been for a year, because of some physical defect. Of these 140,000 about forty per cent. exhibit defects of the oral cavity. In concrete numbers that amounts to 56,000 of the children of Greater New York being kept back because of defects of the mouth and teeth. It costs the state about forty dollars per year to instruct children who have been kept back for a year in the public schools. This would make the expense to the city of New York due to defective teeth about $2,240,000 a year. This is appalling. I looked over the figures several times before I could convince myself that they were correct. The city of New York is a generous spender, and my experience is that what the city does it does well; it does not do it in a niggardly fashion, but is willing to spend what is necessary to do the thing right, and we find the division of Child Hygiene, which has to deal with public school children, spending $651,195 directly to look after the physical welfare of the school children, and wasting over $2,000,000. The argument of the speaker, that if anything is worth doing at all it is worth doing completely, I believe to be reasonable. The dental service in the city of New York at the present time costs, roughly speaking, $24,000 per year, and the carious teeth and diseased mouths of school children

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cost the city of New York a sum so appalling that we hate to mention it. Therefore, on the ground of economy alone, something will have to be done to save the taxpayers, let alone the people and children who are more important than the taxpayers.

Another point. It has been very difficult to obtain figures showing that the actual advantage to the physical welfare of the children is due to dental service in the department of Health, but Dr. Cronin has shown that 20 per cent. of the absences occur among children who have been to the dental clinics and had dental work done, while the absences on the part of those who have not been to the dental clinics nor received dental service amount to possibly 45 per cent. Here is a concrete fact that we can take home—a difference of 25 per cent. in favor of those who have had the service of the dental clinic. Besides the dental clinics, we have Bellevue and the Allied Hospitals in which volunteers are carrying on the work. At Bellevue Hospital over 5956 operations were performed last year. These included nearly one hundred operations for fracture of the mandible and various diseases of the bones of the jaw, such as caries and necrosis. This is another case illustrating economy. Before the dental profession gave the dental service in Bellevue, it was customary that a patient with a fractured jaw had his jaw bandaged daily, and was kept in the hospital under the constant care of attendants for from six to ten weeks. Now the dentist takes the impression, and within two or three days a splint is placed on the jaw, and the patient goes about his business, coming back to the hospital two or three times weekly to have the mouth thoroughly dressed and washed. Cases treated in that way cost the city one-tenth of the amount they used to cost before the establishment of dental service. I am calling attention to this, because when you go before your city fathers or mayors and ask for funds to carry on this work, they first ask as to expenses, and by the illustration just given it can be shown how money can be saved by the community.

In the Harlem Hospital 1556 operations were performed last year; in Fordham 847, in the Gorham 700; and this includes a large list of operations for fractures, etc. This work is done by the appointment of men of the staff of Bellevue and Allied Hospitals, whose positions are rated the same as those of members of the medical profession. In the medical department visiting physicians and internes are assisting; in the surgical department visiting surgeons and internes are assisting, and in the dental department visiting dentists and internes —one person being there constantly as an interne. In the St. Bartholomew, which is the oldest hospital in New York, they employ two men on small salaries; one man who works every afternoon in the week receives six hundred dollars; the other, who works two afternoons each week, receives three hundred dollars. In St. Bartholomew 5009 individuals were treated, 3216 being children, and 1793 adults. The dental operations performed in this clinic, with one man working three hours every afternoon and another working three hours on two afternoons, amounted to over 7340. That is a good deal of work, and it included over 1200 amalgam fillings and nearly 600 cement fillings.

I would like to call your attention to one or two more features in the report of the department of Health. As I have

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pointed out, there are 700,000 children in the public schools of New York. According to the statement made by Dr. Cronin, the children are being treated in about four per cent. of the schools. The department of Health in the first year of the establishment of the clinics, when there was necessarily more or less trouble due to lack of precedents, recorded 87,922 operations, of which over 21,000 were fillings. And yet, as I have pointed out, not ten per cent., perhaps not even five per cent., of the needs of New York City alone are covered. The work done by the bureau of Child Hygiene in their attempt to limit the service to children in the primary grades seems especially commendable, because, as these children grow up, their need of dental service will be practically eliminated, and in the course of years the needs of this service in New York City will be gradually reduced. By the adoption of this intelligent scheme, I believe that in time, even with our present inadequate means, the city of New York will advance considerably beyond its present status in the matter of dental care.

I wish to add in closing, that judging from my experience of about twelve years of active service in this work of oral hygiene, while it may be desirable for the public schools to have control of the physical examiner who shall not only examine the mouths but make further physical examination of the children, the work of caring for their needs will for all time devolve upon the department of Health, and it is my opinion, based upon careful observation of the situation, that this is the only plan that will solve this problem. Dental work must be done along with the work of caring for the eyes, nose, throat, and ears under the direction of the departments of health of the various towns and cities.

Dr. W. A. Howe, Rochester. I was greatly interested in the presentation of the work done by the city of New York. I would like briefly to tell you some of the work along the same line which was done by the state of New York during the term in which I was deputy commissioner of health. Some three years ago it was my privilege to speak before one of your meetings in Rochester, when I found indifference on the part of the dental profession to public health matters, and it seemed to me a pity that men of your intelligence took no more active interest in matters pertaining to public health. I hope the time is not far away when you as a profession will appreciate more keenly the close relations which exist between dental equipment and public health. It has been indeed gratifying to me to see the work progress so rapidly in the past few years. Within a few months of the meeting referred to, the commissioner appointed three of your members as lecturers for this state. I dare say that some of you are familiar with the importance of the work that has been done. As a result of that work, there are now eight or nine cities maintaining dental clinics. We have today a fully paid lecturer devoting his entire time to teaching to the children of the state, and I may say also to the profession of the state, the importance of this branch of public health. It has been one of the popular lines of our work in the state department of Health. There is no one class of work so tempting throughout the state as this field. I believe that you as a profession are rapidly approaching the time when you must consider the great importance of your position in preventive medicine.

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Preventive dentistry has come to stay; you are going to be able assistants to the medical men, who in turn will assist you. The convergence of the two professions of which your chairman spoke is rapidly coming closer, and as a medical man I am particularly gratified to see such a willingness of co-operation and desire to get together to work out the ultimate solution of this important problem. To me it would seem as though you dentists may well consider assisting the medical men in the care of the individuals you meet, by teaching the mother, perhaps, the care of herself in the prenatal period, because I believe that much can then be done by which the health of the prospective child is injured. I believe that this is a question, as has been said, of education—of truth, as one of the speakers emphasized, and the men who must bear the truth to the people are the members of the dental and medical professions. In this state the great department of Health until the present year had at its disposal $278,000 with which to do its entire work. When I listened to the figures cited by Dr. Cronin in speaking of New York City alone as having an appropriation of some five millions of dollars, I wonder that the state department of Health could exist with its mere pittance of less than three hundred thousand dollars. For oral hygiene we have been able to spend only about four thousand dollars a year, and yet we have interested the people of the state; our work is growing, and it is bound to grow still more, but you dentists are derelict in the same sense, in the same way as we medical men are derelict. You should take an active interest in matters pertaining to legislation; you should have some prominent members of your profession in the legislative halls,—members familiar and conversant with the needs of your profession, so that what has happened during the past session would not be so apt to happen. If we could have a few good dentists and a few good physicians as members of both houses, much of the trouble of securing appropriations would be solved, for without money we can do but little. I therefore hope that you dentists will take at least sufficient interest to see that the right type of men, who will look after your appropriations, your items, are sent to the legislative halls.

The great principle that actuated Dr. Cronin's article was that of prevention. It is the same in medicine; the time is rapidly coming when we physicians are going to be sought after to tell our *clientèle* how to prevent disease. You dentists will be expected to tell to families how to prevent disease conditions in the teeth of their children. This great wave of preventive medicine has come to stay, and it is going to be but a short time when you as one profession and we as another will be co-operating. A great field is being opened to you in the line of medical examination of school children. This is a wonderful field that embraces examination of the eyes, ears, nose, throat, and teeth. It is a surprising fact—and that is the only point in which I differ with Dr. Cronin—that there are many medical men in the state of New York who do not recognize the importance of the permanent first molar. Further than that, I believe many dentists of the state are so unmindful of the importance of that tooth as to advise extraction. Within a few months I have had a mother come to my office with a child with a diseased permanent first molar of which the dentist had advised

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extraction. I said, "Madam, that can hardly be possible!" She replied, "Yes, it is possible." Thus, we need to educate not only parents but members of the professions that it is as important to preserve these teeth as it is to have a clean mouth, because a clean mouth and a good dental equipment mean so much not only to the present condition but to the future health of the child.

I shall be always interested in the good work which you are doing, and shall welcome a closer relation between the dental profession and that to which it is my privilege to belong.

Dr. F. W. Low, Buffalo. My remarks perhaps do not belong in this discussion, but I want to make them just the same. If the members of the dental profession would do just a little lobby work, we should not have to go to Washington and Albany as often as some people think they do. We do not even advise our legislators that we have any interest whatever in what they are doing. Whenever the state or Union legislatures propose anything the opposing factions are all there, but we stay at home and do not even take the trouble to write a letter and put a two-cent stamp on it. I have in my pocket a letter which I received yesterday from the representative from Buffalo, saying that the letter he had received was convincing, and that he did all he could to defeat the bill proposing to revive the Low patents on crowns. If every member would do as I did, such bills would be prevented, but we do nothing. I hope that members of this profession hereafter, besides the legislative committee, will take the trouble at least to spend two cents to mail a letter to their representative stating some convincing reason why a certain bill should or should not be enacted.

Dr. C. N. Johnson, Chicago. I feel some diffidence in taking the time of the society, yet I am so full of this subject that I cannot allow the opportunity to pass without just a word. First I wish to express my appreciation of the paper we have just listened to. I have been engaged in this work for some time in our state, and there is a great deal that I could tell this association about the work done there. However, I simply want to take off my hat to New York for what you have done. You have set a pace which it will require some energy for other states to follow.

The statistics in this paper are convincing; so much so that it requires no further argument to prove the fact that dentistry is a community asset. We forget this too frequently. Another thing in this connection is that we forget that the fact of this being a community asset should be impressed upon the people receiving this service. Our humanitarian ideas in regard to the relief of pain are magnificent, but we must have a care that we do not do harm while doing good. I believe when work of this kind is done for people, the parents should be impressed with the fact that it is done because it is a protection to the community. This should be emphasized more than the fact that it is charity service. I believe there is danger in doing too much charity work. Our charitable organizations in this country, in my opinion, do nearly as much harm as good. I believe we should relieve suffering independently of any other factor; if adults or children come to one of these clinics with pain, that pain should be alleviated. But there is danger in the city or state assuming a function which properly belongs to the individual, and these people should be impressed with the fact that

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this is done as a community movement; that we are doing it for the protection of the children and not for the individual himself. We have too many people come to us for charity work, and if we begin to do this work for every individual, we develop a dependence that leads to a certain amount of paternalism. The moment the individual expects something for nothing, he begins a disintegration of character that you cannot correct.

In regard to the remarks made by Dr. Downing as to the attitude of the state organization toward state legislation, I wish to say that we have that down to a very fine point in Illinois. You can teach us a lot of things, but you cannot teach us how to get a bill through the legislature. When we have an enactment up for consideration there, we have fifteen hundred men behind it in the State Dental Society, and we emphasize the fact that it is legislation for the benefit of the people. We never say that it is for the benefit of the profession, but for the public. I would not support any bill that was for the benefit of the profession and not fundamentally for the benefit of the people. When this legislation is proposed, we have an organization in Illinois which swamps the members of the legislature with a wave of mail that floods the capitol at Springfield. One or two letters, as Dr. Low said, will not do any good, but if your governor had received from fifteen hundred men a short, clear-cut statement of the necessity of signing your bill, that bill would have been signed.

Dr. CRONIN (closing the discussion). I merely want to thank the association for the kindly way in which my paper was received, and express my appreciation to Dr. Howe and Dr. Wheeler for their generous discussion. I think Dr. Johnson has again hit the nail on the head in this matter, as he did in the matter of the permanent first molar, by saying that this movement is for the benefit of the community. When we neglect to do for school children what we know they need, we are guilty of criminal neglect, and the amount of money that the state is paying for irresponsibles, represented by the insane, poor, and paupers, represents, to my mind, almost the exact proportion of the amount of money they should expend on the care and physical well-being of school children.

If in any way I have inspired you, or succeeded in interesting you in this great widespread new theory of biological engineering, and if you will take this matter up and preach the gospel wherever you see it waning, I have fulfilled my purpose.

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The Selection of Filling Materials for the Different Classes of Cavities.

By C. N. JOHNSON, M.A., L.D.S., D.D.S., Chicago, Ill.

MUCH as this subject has been written upon, there seems yet to be the necessity for a really definite statement or rather a restatement of the principles involved in the selection of filling materials for different cases. Back of all operative procedures there should be the well-formulated and definite aim of the operator to make such an operation as will most surely serve the best interests of his patient, and not until he has studied carefully the behavior of fillings under varying conditions is he able to select promptly and with assurance the material for a given case which will promise the best service.

It seems to be the tendency of many operators—in fact it is the tendency of humanity in general—to get into ruts, and follow any tangent which leads them along the lines of least resistance. The dentist above all men should guard against this tendency. Too frequently a certain method of procedure appeals to a practitioner, and he follows that method blindly in all cases, regardless of the fact that other methods might serve a better purpose in given instances. A close study of the behavior of filling materials in different classes of cavities is necessary before an operator can determine what is the proper material to be used in all cases, and it is with the hope of aiding in this study that the following suggestions are made. The difficulty of laying down definite rules of practice in this particular is enhanced by the varying conditions which are presented to the operator in his daily work. These conditions must be reckoned with, and it is often a matter of nice judgment to decide what material shall be used; as Dr. F. W. Gethro has succinctly remarked, "There is no best filling material except for the case in hand." And yet there are certain physical properties possessed by one material which are absent in another, and which may prove a prominent factor in determining its availability or unfitness for certain classes of cavities, and it is with this idea in mind that the present paper is presented.

CAVITIES IN THE PROXIMAL SURFACES OF INCISORS AND CUSPIDS.

These are the cavities which of all others present the most difficult prob-

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lem for the dentist to solve. It is not that they are more complicated than some others as far as saving the teeth is concerned. This can be done perfectly with gold foil or, in some instances where the incisal angle is gone, with gold inlays. But in most mouths the teeth are exposed to view in conversation, and the display of gold is objectionable. No matter how much we may assert that the prime object of filling teeth is to stop caries and save the teeth, the esthetic taste of our modern civilization forces upon us another consideration, which we, as a cultured profession, should foster and not combat—*i.e.* the offense imposed upon our higher sensibilities by a display of our dental operations to the eyes of the world. All evidence of our operative interference should therefore be as completely disguised from public view as our ingenuity can enable us to do this, and in this view of the case, gold is often contraindicated on account of its color and lack of translucency. It is undeniable that gold is conspicuous in many mouths in anterior teeth, and if we are to live up to the highest possibilities of esthetic dentistry, we must discard it in these cases. But let it be said in passing that in every instance where gold can be used without being exposed to view, it should be employed as the most certain means at our command for the saving of teeth.

When gold cannot be used, our choice necessarily falls chiefly upon two materials. Gutta-percha is sometimes suggested, but its field is so limited, except for temporary work, that it need not be considered in the present discussion. Our attention, then, must be directed to porcelain and the silicate cements. The fact may as well be recognized and faced at once that neither material will guarantee the same degree of permanence as gold. I am almost tempted to say that both porcelain and the silicates are merely temporary makeshifts, and yet this would seem to be a rather harsh term to apply to materials which have shown instances of good service for many years, and which give promise of as many years to come. But these instances are not sufficiently numerous to entitle these materials to the reputation of being reliably permanent. Of the two, there can be no question that porcelain will last longer than will the silicates in their present stage of development, though it is confidently hoped that the latter will be improved so as to eventually be much more serviceable than they are today. Then they will be preferable to porcelain in one important particular. The margins of porcelain inlays after some years of service are frequently found to be in a very unsatisfactory condition owing to a chipping of the material, or to a staining of the line between the inlay and the tooth. Either of these defects leaves the inlay unsightly. So far as appearance is concerned, the silicates are a distinct improvement over porcelain, and even with their present limitations there are many indications for their use. But they are not sufficiently strong to be relied on for contour work or for fillings in any position where stress is to be applied upon them.

Looking at these two materials with their present physical manifestations, we may follow the general rule that, wherever they are called for, the smaller the cavity the greater the indication for silicate, and the larger the greater the indication for porcelain. We all know the extreme difficulty of obtaining perfect technical results in very small cavities with porcelain, while the lessened

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area for a wearing surface would minimize the danger of abrasion of silicate cement. In large cavities this exposure to wear becomes a serious menace to the life of silicate fillings, while aside from its friability, porcelain has perfect wearing properties. In contour restorations, where the incisal angle is gone, the silicates have proved very unsatisfactory, while with porcelain these angles have been restored with an encouraging record of service apart from the conditions of the margins already alluded to. At best, we have no material which perfectly meets these cases, and every observing practitioner must look forward with anticipation to an improvement in this respect. The only thing we can do today is to limp along with the materials we have at our command, which is not a very flattering commentary on our prestige as a profession.

A somewhat encouraging solution of this problem may be secured in some instances by a combination of the gold inlay with the silicate cements. When the incisal angle has been destroyed a gold inlay may be made, but before casting this inlay, the labial surface is carved in wax to leave a cavity which, after the inlay is cemented, may be filled with silicate cement of the proper shade. Thus the gold is placed where it will receive the stress, and the silicate where it is exposed to view. This will serve a good purpose in certain cases, but it will not meet all exigencies, and leaves us yet with the necessity of a new filling material for anterior teeth.

CAVITIES IN THE GINGIVAL THIRD OF THE LABIAL SURFACES OF INCISORS AND CUSPIDS.

This class of cases is much more readily controlled. In many instances these cavities are out of view, even when the incisal tips of the teeth are exposed, and in every such case gold, either in the form of foil or of inlays, is clearly indicated. There is no longer any possibility of argument against the fact that gold is the most permanent filling we can use in these cases. A careful observation extending over many years has proved this beyond a shadow of doubt, and no amount of argument can disprove what has so clearly been demonstrated by experience. As to choice between gold foil and gold inlays, this must be determined solely on the basis of technique. If a perfect technique can be obtained with gold foil, this is the filling *par excellence* to use. Nothing in all the alchemy of nature has yet been found which will so perfectly protect a tooth against further decay as a pure gold foil filling when it can be made technically perfect. But this cannot always be done in these cavities without too great discomfort to the patient, and when such is the case, gold inlays should be used. This is particularly true if the cavity extends far under the free margin of the gum, and the application of the rubber dam would not only prove painful but might result in such injury as to cause a subsequent recession of the gum. Generally speaking, the smaller or narrower the cavity, the greater the indication for gold foil, and *vice versa*.

When these cavities are exposed to view, the choice must be, as with exposed proximal cavities, between porcelain and the silicates, and the selection should be governed by the same general considerations as have already been mentioned. Probably the silicates have a wider range of usefulness here than elsewhere on account of the better appearance of their margins in these prominently exposed

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surfaces, but in passing, a word of caution must be said with reference to cavity preparation. The sensitiveness of these teeth at this point, and the fact that little stress is to be brought to bear on the filling, tempts operators too frequently to make shallow cavities with little or no mechanical retention. This is particularly true if inlays or silicate cements are to be used, and as a consequence many of these inlays and fillings have been lost through no intrinsic fault of the material itself. Good mechanical anchorage should be provided not only for inlays, but for silicate fillings, one of the chief limitations of the latter materials being that they do not cling so tenaciously to the dentin or enamel as do the oxyphosphates.

CAVITIES INVOLVING THE INCISAL EDGE OF INCISORS AND CUSPIDS.

If these cavities are situated merely lingually of the labial plate of enamel, and do not involve that plate, they are best protected with gold foil or platinum-gold, but if the entire incisal end of the tooth is involved, so that the labial plate must be lengthened and the filling exposed to view and to attrition, gold or porcelain inlays are indicated. With gold the esthetic feature is sacrificed, and with porcelain there is never any assurance of long-continued service, though it is true that when the stress of attrition is brought to bear squarely against the inlay, porcelain has been known to last a long time. Were it not for appearance and for the long-drawn-out nature of the operation, the very best material for these incisal restorations is platinum-gold. No other kind of protection can be given such teeth which will so serviceably answer the purpose as this material, but its color and exacting technique limit its use.

CAVITIES INVOLVING THE PROXIMAL AND OCCLUSAL SURFACES OF BICUSPIDS AND MOLARS.

It is in the management of these cases that probably the greatest change has been made in the last ten years. Previously thereto, the majority of these cavities were filled with gold foil or amalgam, but since the advent of the inlay, particularly the cast gold inlay, a very general stampede has ensued toward that method. The discussion as to the relative merits of gold foil or inlays in these cases seems to have nearly subsided, and as a matter of fact it might as well subside entirely, because in the face of all our discussions over this matter, our patients have taken the decision largely into their own hands, and have alined themselves almost as a solid phalanx on the side of the inlay. We may indulge in long and learned discussions as to the virtue of gold foil, but when it comes to undergoing the discomforts of the rubber dam and having a large gold foil filling in a bicuspid or molar malleted, trimmed, and polished in the mouth, the entire operation requiring an hour or an hour and a half, and comparing this kind of a session with the relative ease of having an inlay inserted, there is no kind of argument that will impress the patient sufficiently to gain his consent to have a gold foil filling inserted. We may as well face the situation as it is, particularly in view of the fact that gold inlays, when well inserted in these cavities, give promise of most excellent service. It is safe to say that since inlays have been used so extensively the interproximal spaces and

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contact points are preserved in a more normal condition than when foil fillings were inserted in these same cavities, and this of itself is a very important consideration.

The use of amalgam may also be said to have declined since the advent of the inlay, and this is a distinct gain—not that amalgam should be looked upon as an inferior material, but because there can be no question that the use of gold inlays tends to produce a higher class of service than the use of amalgam. Never in the realm of dentistry has a more radical change been made than by the general introduction of the gold inlay into practice, and this change will mean much for the future preservation of the natural teeth if the profession does its full duty by the inlay.

CAVITIES IN THE OCCLUSAL SURFACES OF BICUSPIDS AND MOLARS.

These cavities are usually started in the pits and fissures left by developmental defects in the teeth. They are not the same class of cavities as those which form in smooth surfaces where the enamel is good, and their management is somewhat different. If gold inlays are largely indicated over gold foil for proximo-occlusal surfaces, the converse is true of simple cavities in occlusal surfaces. In these cases, gold foil will serve a much better purpose than inlays, and the exactions in inserting it are not so great as with proximo-occlusal fillings. In fact many of these occlusal fillings may be inserted without the rubber dam, and the aggregate of time employed is much less than that necessitated in the construction of an inlay. Moreover, as has been previously remarked, there is no other protection for a cavity so perfectly reliable as gold foil when properly inserted, and in these instances it is possible to get a perfect technique with little tax on the operator or patient. In cases where caries has merely followed the fissures or is located only in the pits, it is useless to cut away sound tissue to widen the cavities sufficiently to make inlays practicable. Inlays do not lend themselves readily to small or narrow cavities, and the operation is less exacting and the results are more certain with foil in such cases. In fact, in many instances a good foil filling may be inserted in the length of time required for finishing the wax model of an inlay, and this is particularly true of deep and narrow cavities following fissures, which can very quickly and serviceably be filled with non-cohesive foil, sealing the cavity so as to protect it perfectly against recurring decay. In cavities presenting any appreciable area to the attrition of mastication, the non-cohesive gold should be covered with cohesive to provide a better wearing surface, and in some very extensive occlusal cavities, where much tissue has been lost and when the patient is so difficult to control as to jeopard the probability of a perfect foil filling, the insertion of a gold inlay may be found more serviceable.

In some of the small pit cavities in young patients, a combination of tin and gold will serve an excellent purpose, and this material can be inserted more rapidly than gold alone. In fact, after its manipulation is mastered, it may be inserted in these cases more easily than amalgam, and its length of service is greater, many of these fillings having been under observation for fifteen or twenty years.

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CAVITIES IN THE GINGIVAL THIRD OF THE BUCCAL OR LINGUAL SURFACES OF BICUSPIDS AND MOLARS.

In these cases, the judicious use of gold inlays or amalgam is clearly indicated. The difficulties of keeping such cavities dry, especially when they extend under the gum, as many of them do, are so great, and the application of the dam is so painful, that the inlay method is usually preferable to gold foil. In cases where economy is paramount amalgam may be used, but the margins of amalgam fillings in this class of cavity are seldom satisfactory after a few years of service, and inlays should be inserted wherever possible.

PIT CAVITIES IN THE LINGUAL SURFACES OF INCISORS AND IN THE OCCLUSAL THIRD OF THE BUCCAL SURFACES OF MOLARS.

Here is a condition where the teaching may be definite and dogmatic. There is really only one kind of filling material indicated for these cases, and that is gold foil, usually in an unannealed form. The nature of the decay, the manner of its progress, and its position on the teeth, all combine to indicate foil and to contra-indicate inlays, while the ease with which foil may be inserted renders it foolish to attempt inlays. A cavity of this kind once properly prepared and filled with foil may be looked upon as about the most permanent operation that can be performed in the human teeth, and it is usually neither difficult nor painful.

CONCLUSION.

The foregoing consideration of the indications for the various filling materials has been guided by the thought that the aim of the profession should be in the direction of preventing cavities instead of filling them; but the essayist's conviction is strong that it will yet be many years before prevention becomes an established fact, and in the meantime the best service we can give our patients is to arrest caries as it arises, by filling the cavities. In doing this, it is well for us to study carefully the indications for the use of the materials at our command, so that we may employ them to the best advantage and for the welfare of those whom we serve.

DISCUSSION.

Dr. A. L. SWIFT, New York, N. Y. When accepting the president's invitation to open the discussion of Dr. Johnson's paper, I remarked to him that, judging from my familiarity with the writing and teaching of Dr. Johnson, his paper would undoubtedly so thoroughly and comprehensively cover the subject that one who has been so nearly in accord with his former expressions on this subject as myself would find very little to discuss.

The reading of this admirable paper confirmed my conjecture, so if my discussion, which must necessarily be taken up under the classification of the

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author, seems to be largely a repetition and mainly an agreement with the essayist, I can but ask your indulgence, with the promise that it will at least be brief.

The essayist very aptly calls our attention to the tendency of many operators to get into ruts, and to follow tenaciously certain methods of procedure which appeal to them in all cases, unmindful of the fact that other methods in many instances might be of far greater service.

The statement of many gold inlay enthusiasts that they have relegated their gold pluggers to the ash-heap, the discussion of such subjects as "The Passing of the Gold Foil Filling: A Prophecy," and the zealous advocacy of porcelain inlays by others, seem to confirm the statement of the essayist that we are apt to get into ruts.

If this be true—and we must acknowledge that it is—a careful selection of filling materials for the different classes of cavities as outlined in Dr. Johnson's paper seems to be most timely.

Agreeing with the essayist's statement that "No filling material has yet been found which will so perfectly protect a tooth against further decay as will pure gold foil where it can be made technically perfect," I still find use for my gold pluggers, and believe that in certain classes of cavities, gold foil will serve a much better purpose than inlays. Undoubtedly it is the custom to insert gold inlays in small cavities where gold foil could be used to much better advantage, as they would occupy on the whole much less time and avoid the useless cutting of sound tooth structure for the enlargement of cavities which is necessary to render the insertion of inlays practicable.

In the treatment of cavities in the approximal surfaces of incisors and canines, the question of esthetics confronts us, and if gold fillings would be too conspicuous, we must of necessity turn to either porcelain or the silicates. The essayist has pointed out the undesirability of porcelain inlays, due to the frailty of their margins and the staining of the lines between the inlay and the enamel, and has contrasted the greater wearing qualities of porcelain as compared with those of the silicates, giving the preference, so far as appearance is concerned, to the silicates, but condemning the lack of strength of the silicates as unreliable for contour work and in positions where the stress of mastication is to be reckoned with. Agreeing entirely with these deductions and acknowledging the handicap involved in dealing with these imperfect materials, it seems impossible to follow any general rule as to the choice of either.

Dr. Johnson suggests "following the general rule that, wherever these materials are called for, the smaller the cavity the greater the indication for silicate, and the larger the cavity the greater the indication for porcelain." The latter part of this rule, referring to the use of porcelain in large cavities, I agree with, but in small approximal cavities, notwithstanding the difficulty of obtaining perfect technical results, the porcelain inlay has proved more satisfactory than have the silicates in my experience.

The restoration of the incisal angle with a gold inlay, the labial surface of which has been prepared to receive a filling of silicate after the inlay has been set, certainly helps to solve this question in some cases. I have seen more lasting results, however, by porcelain baked into

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the labial surface of the inlay, although the silicate serves better as to appearance.

In cavities in the gingival third of labial surfaces of incisors and canines which are not exposed to view, gold foil or gold inlays are indicated, the choice of either depending upon the size of the cavity and the proximity of the gum margins. In those exposed to view, again, the question of the choice between porcelain and the silicates must be met, taking into consideration the better appearance of the silicates as against the better wearing qualities of porcelain.

The note of caution interjected by Dr. Johnson as to cavity preparation in this class of cavities, with special consideration of the necessity for good mechanical anchorage where inlays or silicates are to be used, is most opportune, as a large percentage of such failures are due to shallow cavities with insufficient anchorage.

Regarding the treatment of cavities involving the incisal ends of incisors and canines, I am thoroughly in accord with the essayist's conclusions.

In cavities involving the approximal and occlusal surfaces of bicuspids and molars, the cast gold inlay is indicated, except when the question of economy necessitates the use of amalgam. The gold inlay minimizes the strain on the patient, avoids the discomfort of the rubber dam, the separation of the teeth, the tedious malleting of gold foil and finishing and polishing of the filling in the mouth, and is a godsend to the patient. The ability to preserve perfectly the interproximal spaces with not the slightest excuse for injury to the gingival attachments which so often is the result of finishing gold foil fillings, is a strong argument in favor of the gold inlay, assuming of course that the inlays are made technically perfect. Here, too, a note of warning should be sounded as to the perfect adaptation of the inlay at the gingival border and the necessity for perfect mechanical anchorage, dependence to be placed upon recognized mechanical laws for retention where so much force is to be exerted, and not upon the cement. Recurrent failures along these lines have caused many patients to decide that all gold inlays are to be avoided.

As to cavities in the occlusal surfaces of bicuspids and molars, gold foil is indicated in small pit and fissure cavities for the reasons enumerated, but in extensive occlusal cavities the gold inlay is most suitable; in fact, in these cavities especially, the ability to restore normal occlusion by appropriate carving of the wax core is most important, and possesses possibilities which should never be overlooked, if we would restore these organs to their full field of usefulness.

In cavities in the gingival third of the buccal or lingual surfaces of bicuspids and molars, I agree with the essayist that gold inlays or amalgam are clearly indicated in preference to the use of gold foil, especially when the cavities extend under the gum, the inlay to be given the preference over amalgam where it is feasible.

In small cavities in the lingual surfaces of incisors and in the occlusal third of the buccal surfaces of molars, gold foil is undoubtedly the best material; if they have become extensive through neglect, etc., the gold inlay would be my preference.

I wished to refer to the indications for the use of copper oxyphosphate in certain classes of cases, and other phases of this subject, but decided to confine

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my discussion entirely to the paper as presented.

In closing his paper, Dr. Johnson says, "The aim of the profession should be in the direction of preventing cavities instead of filling them"; but he adds his strong conviction that the millennium of preventive dentistry will not become an established fact for many years to come, and in the meantime he makes it incumbent upon the profession to live up to the highest ideal of service for the greatest welfare of humanity—a fitting climax to an admirable paper.

Dr. S. E. DAVENPORT, New York, N. Y. I trust that our president will allow me a personal word, even if it be out of order. I find myself feeling singularly at home in this body, considering that I made my last appearance at a meeting of this society thirty-six years ago. In May 1878 the degree of M.D.S. was conferred upon the late Dr. R. C. Brewster of Brooklyn, the late Dr. Charles (Quaker) Miller of New York, Dr. Isaac B. Davenport of Paris, and myself, the diplomas bearing the names of Leon F. Harvey, president of the society, S. A. Freeman, secretary, and Norman W. Kingsley, William Jarvie, Jr., S. D. French, C. F. Rich, Stewart B. Palmer, S. H. McCall, F. French, and A. P. Southwick, censors.

Is not that a document to be proud of? And what memories of accomplishment those names arouse!

Being a Massachusetts Yankee, I will hazard the supposition as a "guess" that after Dr. Johnson accepted the invitation to present a paper at this meeting, he gave some considerable time to earnest thought before he decided upon "The Selection of Filling Materials for the Different Classes of Cavities."

I am glad to have heard this paper and to partake in its discussion. We are advised, all through the paper, to consider carefully the demands and peculiarities of the cavity we are at work upon and to choose a filling material in accordance therewith. That is true conservatism, of which we have had too little during these last years. The old conundrum—"One run, all run," with its answer, "Sheep"—may be said to apply to dentists, and we are very apt not only to run fast in a body, but to adopt new methods or materials so fully as to use them to the exclusion of better and well-proved materials.

Having recently heard a prominent New York City practitioner state that he used only gold inlays for the molars and bicuspids and silicates for the anterior teeth, and that he never used the rubber dam; having been told by another that he never used gold foil now that we have the inlay method; by another that he never used amalgam; having read several papers and even editorials advocating in effect the use of gold inlays to the entire exclusion of gold foil fillings, it is refreshing to hear a paper condemning ruts and hobbies and advocating thoughtful decision in the selection of filling materials, from a man of Dr. Johnson's standing, a teacher and an editor as well as an operator. It is a relief, indeed, to learn from so high a source that usually we really have a choice of materials, and that we are not, after all, to be limited to one plan, one method, and one material selected for us by some of the radicals of the present day. The paper to which we have just listened, like some of the recent writings of Dr. Clarence J. Grieves of Baltimore, William W. Atkinson of Philadelphia, Dr. J. Edmund Kells of New Orleans, Dr. H. B. Tileston of Louisville, and

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Dr. Herbert L. Wheeler of New York, encourages us to apply calm, logical judgment to our daily problems, and the right note has therefore in my opinion been struck by Dr. Johnson. To show how fully in accord I am with Dr. Johnson's position, I take the liberty of quoting the following from a paper entitled "The Choice of a Filling Material," which I read before a Massachusetts society:

> Perhaps this is the proper place to state that for many years I have contended that every cavity will, before it is fully excavated, tell us in no uncertain language what material it should be filled with. Sometimes, of course, we could use either of two materials with the same probability of preserving the tooth.
>
> Sometimes, because of a lack of familiarity with the particular mouth, we find our only positive testimony in the direction of what the cavity should *not* be filled with. In such cases we should select the best of the remaining materials, recognizing that our choice was experimental, and depending upon the result for future decisions in the same mouth.
>
> Careful records of all operations are of course necessary for the guidance of our best judgment, and system in all directions is an aid to progress in this, as in all other departments of our work.
>
> The health and age of the patient, the condition of fillings already in the mouth, the composition of the saliva and mucus, the structural strength of the particular tooth, and the proportion of mastication it will be called upon to perform—all these and other influencing points should be considered before we choose our filling material.

If I should be requested to state what, in my opinion, is the most dangerous element of present-day practice, I would reply, "The thoughtless and ruthless destruction of tooth structure."

We should guard against this more carefully, and one of the most important questions governing our choice of a filling material should be, "With what material can I fill this tooth, to stop its decay and make it useful, with the least destruction of tooth substance?" Large gold inlays are often inserted, after extensive cutting away of strong tooth substance to make the impression or inlay wax "draw," when a small gold foil or amalgam filling would preserve the tooth and conserve the tooth structure. I have heard it stated as an argument for extensive cutting away of tooth substance and the use of gold inlays that small gold or amalgam fillings will fail. Some of the best gold inlays I know of are those the leaking margins of which I have had the privilege of repairing with amalgam.

As I stated previously, we are too apt to use a material in a wholesale way, while it should be used only on occasions. I once heard one of the best dentists who ever belonged to this society state in a meeting of the New York Odontological Society that he believed copper amalgam to possess all the attributes of an ideal filling material. He lived to regret his ready use of it.

Many of the best practitioners, thirty-five years ago advocated the extraction of the permanent first molars as a panacea for all ills of malocclusion, and lived—many of them—to regret it. I could call to your minds many other illustrations of too general use of methods possessing value in individual cases, but that is unnecessary, my point of argument being only that the extremely radical is shortlived. The thoughtful, carefully chosen conservative plan is the one to tie to. That is why I applaud Dr. Johnson and extend to him my felicitations.

Dr. C. F. Ash, New York. While I do not wish to appear as being appointed chief objector to any remarks Dr. John-

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son might make, I must take exception to one or two points in his paper as I took exception this morning to what he said.

He made the statement that, in his opinion, the best filling material for the gingival third of the molar or bicuspid on the lingual or buccal surface is amalgam or a gold inlay, if such is possible. It is my opinion, backed by the opinions of some other practitioners, that the immunity to the recurrence of caries is greater around a porcelain inlay than around a gold inlay. Granting the difficulty which the average patient has in keeping thoroughly clean the buccal and lingual surfaces of the molars especially, you will readily agree that they can keep a properly constructed porcelain inlay cleaner than they could a gold inlay with the same amount of effort. If it is possible to insert an inlay of any sort at that point, I should give preference to a porcelain over a gold inlay.

In reference to the use of silicate cements, the essayist said that the average operator finds work on cavities which involve the cervical margins of incisors to be so painful that he is inclined to stop short of imparting to the cavity a mechanically retentive form.

A great many operators have reported failures of silicate cements, while some few have reported very satisfactory successes, and in talking with the latter I have found that the method which I advocated some years ago has been followed by them, that is, before inserting a silicate cement filling, no matter of what make, the cavity should be lined with oxyphosphate cement. If that is done, it is not necessary to secure as much mechanical retention as might otherwise be required. It is only necessary then to prepare the cavity in the same way as for an ordinary porcelain inlay.

Dr. J. V. Conzett, Dubuque, Iowa. I have no criticism to make upon Dr. Johnson's paper. I might emphasize, however, some points and depart from some of his methods or procedures in some cases, for Dr. Johnson has given us the ideal, and we cannot always follow the ideal.

I cannot too strongly emphasize that we should be careful not to follow the line of least resistance. Even though nature does so, though water, in order to find a level, when it comes to an obstruction goes around it, and electricity, instead of jumping over a small air-space, will travel over miles of wire, yet when a human being follows the line of least resistance, his character and will power become weaker.

I have frequently said to students that if the gold filling served no other purpose than that of obtaining the most perfect technique which it is possible for the operative dentist to obtain, it should never go out of existence; for I believe there is no better method of perfecting the operative dentist than by the making of gold fillings. I fully believe that the operators who have thrown away their gold pluggers will pick them up again. Every man who calls himself an operative dentist should perfect himself in the making of fillings of any kind, whether they be amalgam, gold foil, gold inlays, porcelain inlays, or cements. A man cannot lay claim to the title of operative dentist until he is the master of all materials and methods; then he can choose the best method for the operation under consideration. As Dr. Gethro has aptly said, there is no one best method or set of materials for all cases,

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but for the case under treatment there is one best material to be used, and the material which is best for you to use in a given case may not be the best material for *me* to use and *vice versa*. The patient's advantage should be considered above all else.

The gold filling is, as Dr. Johnson has said, the king of filling materials when properly used, but it is one of the most exacting, and the great number of failures have not been due to faulty material, but faulty manipulation. The strain incident to the use of gold foil is not tolerated by many patients, and we are driven away from the gold filling to the inlay or other substitutes.

I shall read a paper tomorrow on the relative values of the gold inlay and the gold foil filling, and therefore will not take up the question now.

In regard to amalgam fillings in the gingival third of molars and bicuspids, I believe that whenever possible, it is best for us to get away from the amalgam filling in that particular class of cavities, because the packing of amalgam requires pressure, and *maintained* pressure. If we insert amalgam in a long narrow cavity, as in the gingival surface of a molar or bicuspid, around which we cannot place a matrix to retain the material, and with the plugger point exert pressure on another portion of the filling, we disturb the portion already placed, and do not obtain sufficient adaptation to make an impervious filling. If we can place a matrix around a cavity in such a manner as to make it box-shaped, then we can insert amalgam and condense it, and obtain a perfect result.

Dr. Ash claimed that caries is more liable to occur around a gold inlay than around a porcelain inlay. I do not believe that this is true. I believe that a well-made gold inlay will protect the tooth better than a porcelain inlay by reason of the fact that we can protect the enamel rods with the gold inlay better than with the porcelain inlay. Cavities in the gingival third must have the enamel rods protected by reason of the histological structure of the rods. By virtue of a perfect knowledge of the arrangement of the rods, we may make a cavity so that there will be no short rods left; but it requires a perfect technique, and the reason why edges appear around porcelain inlays is not so much the dissolving of the cement, but the imperfect enamel margins; short enamel rods have been left at the surface of the inlay, and these break down, leaving a ditch. The recurrence of caries around porcelain, gold, or any filling is not so much due to leakage as to imperfect extension. Caries recurs less frequently at the margin than contiguously to the margins, in portions not properly extended, and from there it extends to the filling or inlay. A gold inlay with a properly beveled margin and a flange of gold which can be burnished to the tooth, thereby sealing the ends of the enamel rods and the cement, will give protection to the enamel margins which is second only to that of a well-made gold filling.

Dr. H. E. S. CHAYES, New York. What is the reason that the apparent agreement running through the discussion of Dr. Johnson's paper in reality means a disagreement with Dr. Johnson's views? Is it because they agree so perfectly with what Dr. Johnson said, or is it because of the difference of their understanding of what Dr. Johnson said? I did not understand Dr. Johnson to say that the gold foil filling is more advantageous than the gold inlay because of the conservation of tooth structure, and

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particularly he did not say that this is the case when the gold inlay is indicated. Nor did I understand him to say that the silicate cement filling is more advantageous than the porcelain inlay when the latter is indicated. The essayist tried to give us what we so seriously need, viz, a standard for the use of various materials in their various places. But the very fact that the different men who heard Dr. Johnson's paper understood his paper differently proves that there is something wrong with our conception of dentistry and its requirements. We have no standardized conception of dentistry. How, then, can we have any conception of the requirements of that of which we have no conception at all? I do not know how we are going to remedy this all at one fell swoop, but the men who have been called radicals are not to be condemned for the fact that they are radical—for if it were not for their radicalism, dentistry today would be in the same position that it was thirty years ago. It is not confirmed conservatism that makes progress in the profession; it is not the man who sticks to one method and practices it throughout his entire life who is responsible for the growth and the concrete ideas that seem to emanate from some of the men who today are called radicalists. It is the man who is willing to try the new thing carefully and conservatively, for the sake of his patients and for the growth of his profession, so that it may be consecrated to the service of humanity, for which it is meant. We must try innovations if we wish to grow. I emphasize this, although tonight that which in time should prove the greatest conserver of teeth, the gold inlay, has been subtly condemned. We shall come to realize that it is what some of us have intuitively realized it to be, the greatest saver of tooth structure, even though it involves temporary sacrifice of a little more structure for better and more perfect construction. The more a tooth needs restoration, the greater is the call for the gold inlay; and the greater the number of surfaces of a tooth calling for restoration, the greater and more insistent is the call for restoration by the cast gold inlay. The writings of Ottolengui, Young, Rhein, and your humble servant have been persistent and insistent enough to uphold that contention, and last but not least, Dr. Conzett, in his admirable articles which were published in the *Items of Interest,* I think made it plain that he who objects to the cast gold inlay is not a master of the technique. For the sake of our profession, let us master this work before we criticize; let us acquaint ourselves with the details of the work which carries with it the germ of possibility of saving more teeth than the dentist has ever been able to save by purely mechanical means—and that is all that we are considering tonight. We cannot assume, in justice to the cast gold inlay and to our patients, that the gold foil filling has advantages in large extensive cavities over the cast gold inlay. I agree that there are some cavities in which gold foil fillings are indicated, but they are growing fewer. Because of the persistence of the dentist in employing gold foil fillings indiscriminately, cavities are getting larger, and the need for gold foil is getting less, in spite of the effect of the great wave of prophylaxis that is sweeping over the land. An operator must acquaint himself with the possibilities of this new technique before he can condemn it. It is up to you to ask yourself the question whether you will

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perfect yourself in the technique of this new work, or whether you will wait until this wave of intuitive realization which is sweeping over the land has enlightened the public, and will make the public tell you what you should have told them.

Dr. JOHNSON (closing the discussion). I am greatly flattered by the reception of the paper, and awfully discouraged. If I could have had a little more opposition, I should have felt more comfortable. The few voices of opposition seem to have been silenced by Dr. Conzett. He has refuted Dr. Ash's indorsement of the porcelain in preference to the gold inlay in the cavities specified. I want to ask Dr. Ash what is there in a filling that saves carious teeth? It is the proper sealing of the cavity against leakage, the proper protection of the margins of the cavity. As Dr. Conzett said, these margins must be laid in certain areas in order to prevent recurrence of caries around the filling, and the gold inlay will preserve teeth against the recurrence of caries in those portions as perfectly as the porcelain inlay. In other words, there is no therapeutic action in porcelain which makes it more advantageous as a tooth-saver than gold, given the same degree of manipulative skill.

Dr. Chayes remarked that we must not too much condemn the radical. Unless some men have the courage and the enthusiasm to go a little ahead of the profession and try out new methods, we shall not make much advancement, and I am far from advocating that kind of conservatism which prevents men from testing the new. Nevertheless, we owe it to our profession that we shall not allow the enthusiasm of the moment to cause us to lose sight of our old friends, the true and tried. So many times men have advocated discarding the use of gold pluggers. The time has not yet come in dentistry when we can serve our patients to the best advantage and discard our gold pluggers. It may come some time, but only by reason of the introduction of something we have not had among our filling materials, because, as I said in my paper, there is nothing in the alchemy of nature with which we are familiar today that so perfectly protects the teeth from progressive caries as a perfectly adapted gold foil filling.

In closing, I wish to express my keen appreciation of the privilege you have extended to me to appear before your association. I want to apologize for not having come here before. The one reason for that is that usually our own state dental association meets in the same month as yours does; but this year we had our meeting a month or two earlier. You have done me the honor on many occasions of inviting me here; in fact, as I told some friends today, I have been invited so many times that I was ashamed to refuse any longer. I want to express my appreciation of the courtesy shown me, and on behalf of the Illinois Society I extend to any and all members of the New York State Society a cordial invitation to meet with us at any time, as we are glad to meet with you.

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Report of Committee on Scientific Research.

By Dr. W. B. DUNNING, Chairman.

MR. PRESIDENT:

I THINK it is quite superfluous for me to introduce the gentleman who is to make the address of this afternoon, as he has become our valued friend during the past five years, as well as our honored member. We also are exceedingly fortunate in having with us at this time four eminent investigators capable of discussing this intricate and new subject to be presented by Professor Gies—namely, Dr. Rogers of New York, Dr. McCrudden of Boston, Dr. Price of Cleveland, and Dr. Brown of Milwaukee; and I am sure that the presence of these gentlemen will add materially to the interest of the important subject to be discussed.

As you remember, last year Professor Gies delved into the possible relationship of potassium sulfocyanate to susceptibility and immunity to dental caries, and he stated at that time that, in so far as the laboratory work was concerned, he felt that he had brought the subject to a close. He did, however, make the statement that clinical work would now be in order to establish some facts in regard to the possible effects of the administration of potassium sulfocyanate.

The last time the committee consulted with him in regard to this aspect of the subject, Dr. Gies submitted an outline of what he would consider the correct procedure of such further work, to be carried out either by this society or other investigators. Your committee considers it important to place this upon record, and I shall therefore read his outline at this time:

GENERAL OUTLINE OF PROCEDURE IN A PROPOSED STUDY OF SULFOCYANATE AS A POSSIBLE PROPHYLACTIC FOR DENTAL CARIES. By WILLIAM J. GIES, PH.D., COLUMBIA UNIVERSITY.

[*I. Explanatory letter, Feb. 4, 1914.*]

CHAIRMAN, Research Committee, Dental Society of the State of New York.

Dear Sir,—As I stated to you and your associates, when we conferred here in December, I feel that the proposed study would not be worth while, if it were not based on a plan that would withstand the most searching scientific criticism.

Fully a dozen suitable persons should be selected as subjects, and at least six dentists and as many physicians should be involved in the formal examinations. Twice each of these numbers would be better.

A period of at least a year should be devoted, in the case of each subject, to "control" examinations, conducted quarterly. The control examinations would establish individual peculiarities beyond any possibility of subsequent confusion of cause with coincidence.

A preliminary conference, between subjects

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and dentists, should be held about a month before the initial examination of record, for the establishment of necessary standards in both supplies and procedure. Your committee would have to agree upon the selection of standard supplies for the use of both the subjects and the dentists.

It is essential, I think, that saliva for the tests be collected quarterly by the subject in his or her own home, for the removal of psychical influences, and also at a time bearing a definite relation to the last preceding meal for the day, in order to prevent the variations in salivary character that might be due to irregularities in nutrition. More frequent collections of saliva would be desirable.

The proposed salivary examinations are the only ones that seem to bear on the matter in hand. We should be glad to conduct as many such analyses as might be desired of us here in this laboratory.

The estimation, by the dentist at each examination, of probabilities of change in the future condition of the teeth might do much to explain subsequent alterations, if any were noted. The nature of the examinations the dentists should make can be decided by you without any help from me, but my suggestions in this connection may be of some use to you in formulating your own ideas.

The proposed medical examinations should be conducted by the physician, in each case, absolutely independently of those by the dentist, and *vice versa*. The nature of the patient's occupation, and his environment in his occupation, residence, and travels, might explain much in his nutritional condition (and the state of his teeth) that would otherwise be obscure.

The remaining items in the proposed *medical* examination (see Outline herewith; G, 3 to 6) relate to the condition of the teeth, directly or indirectly.

A full report of each dental and medical examination should be forwarded (immediately after the completion of each examination) to the chairman of the Research Committee, so that the data might be recorded in an evolutionary plan for the prompt discovery of any points of significance suggestive of additional features for incorporation into the research. The knowledge that each report would be a closed one and not subject to future revision after further examinations, would make each examiner more judicial in his observations and comment, if that were possible in any case.

The research should be conducted by dentists and physicians in widely separated districts. It would be best to start the work on all subjects on a given date, each series of examinations to be made within a given week on a definite schedule, prepared by the Research Committee and in the possession of all examiners.

It might be very difficult to start this research effectively before your May meeting. At that time co-ordination in plans for, and instructions to, examiners could be effected in oral conferences.

After a year for the establishment of "control," *i.e.* normal, data there should be a year during which each patient would be subjected to sulfocyanate treatment, this year to be followed in turn by a third year under "control" (normal) conditions. My proposals in the outline relate in detail to the work of the first of the proposed three years. Details of sulfocyanate treatment would be the only additions to the plan for the remaining yearly periods, unless the results of the first year's work would require other modifications.

Although most of the suggestions in the accompanying outline need no special explanation, before your committee decides whether you wish to proceed along the lines indicated, I should be glad later, if you desire it, to place, under each item in a copy of the outline, a brief explanatory statement for the benefit of all concerned.

I should be glad to confer with you further on any matter related to this subject.

With kindest regards and best wishes, I am,

Yours cordially,

WM. J. GIES.

[*II. Outline.*]

BEFORE TREATMENT WITH SULFOCYANATE.

I. EXAMINATIONS BY THE DENTIST.

A. *Conference between dentist and subject about a month prior to the beginning of the formal examinations.*

1. Approved brush and cleansing materials presented to the subject (standard selections).
2. Method commonly used by the subject to brush his (her) teeth (*demonstrated by the subject to the dentist*).
3. Capacity of the subject properly to brush his (her) teeth *after* special instruction on this point by the dentist (*demonstrated by the subject to the dentist*).
4. Explanation by the dentist, to the subject, of variability in the secretion of saliva and its reasons.

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5. Demonstration, in detail *by the dentist*, of the standard method of collecting saliva for use in the chemical tests (materials to be supplied to the subject).
   - .1—Preliminary flushing of mouth with water, with subsequent "resting" period.
   - .2—Chewing of *standard* flavored gum as *uniform stimulant*.
   - .3—Collection of saliva through funnel into bottle in *standard time*.
   - .4—Necessity for preventing evaporation, or admixture with extraneous liquid, explained to the subject.
   - .5—Method of shipment or transportation of saliva to the chemist indicated.
6. Demonstration in detail, *by the subject*, of capacity to follow directions 5.1—5.5, inclusive.

B. *First formal examination.*

7. General condition of the teeth *before* their thorough cleansing by the dentist.
8. General condition of the teeth *after* their thorough cleansing by the dentist (7).
9. Number and position of sound teeth and of fillings.
10. Condition in detail of teeth and fillings individually.
11. Probability of decay, within *estimated* periods, at suspected points in the *teeth*.
12. Probability of deterioration, within *estimated* periods, at suspected points at the edges of *fillings*.
13. Prevailing dental conditions that might tend to favor decay at particular points.
14. *Special* oral conditions and influences that may be noted, whether they appear to relate to decay or not.
15. Condition of other parts of the mouth:
    - .1—Gums.
    - .2—Tongue.
    - .3—Oral surfaces in general.
    - .4—Throat and nose.
16. Saliva (chemical and mechanical qualities) collected by subject at home at a *given hour* (by standard method—5), following *standard meals* for the *day of examination* and the day before; chemical analysis by standard methods.
    - .1—Volume.
    - .2—Viscosity.
    - .3—Reaction (quant've), both as to acidity & alkalinity.
    - .4—Total solids.
    - .5—Sulfocyanate content.
    - .6—Chlorin content.
    - .7—Fermentation index.

C. *Quarterly re-examinations.*

17. Items 7 to 16 (above) repeated.

II. EXAMINATIONS BY THE PHYSICIAN FOLLOWING, WITHIN A DAY OR TWO, THE EXAMINATIONS BY THE DENTIST.

To be noted at each quarterly re-examination: C to G (3 to 6).

A. Age.
B. Sex.
C. Weight and height.
D. Occupation.
   1. Nature.
   2. Environment.
E. Residence (environment).
F. Extent and duration of travel, if any (within three months).
G. Health at time of, and between, quarterly examinations.
   3. Diseases: any and all kinds observed, acute and chronic.
      - .1—Dates of attacks.
      - .2—Duration.
      - .3—Degree (severity).
      - .4—Medication (nature and duration).
      - .5—Convalescence (duration).
   4. Nutritive condition.
      - .1—Well or poorly nourished.
      - .2—Appetite.
      - .3—Constitution.
        - .01—Muscular equipment.
        - .02—Heart and circulation.
        - .03—Obese.
        - .04—Anemic.
        - .05—Nervous state.
        - .06—Skeleton.
      - .4—Dyspepsia.
      - .5—Constipation.
      - .6—Diarrhea.
      - .7—Condition of nose, throat, tongue and oral membranes.

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5. Features of daily food selection.
   .1—Kinds of food usually constituting the meals.
   .2—Character of desserts.
   .3—Special dietary fondnesses (gratified).
   .4—Kind and quantity of food eaten before retiring.
6. Habits affecting appetite and nourishment.

DURING TREATMENT WITH SULFOCYANATE.

I. EXAMINATION BY THE DENTIST.

Items I, B, 7 to 16 inclusive (above) followed at each quarterly examination.

II. EXAMINATION BY THE PHYSICIAN.

Items II, C–G, 3 to 6 inclusive (above) noted at each quarterly examination.

AFTER THE CONCLUSION OF THE TREATMENT WITH SULFOCYANATE.

I. EXAMINATION BY THE DENTIST.

Items I, B, 7 to 16 inclusive (above) followed at each quarterly examination.

II. EXAMINATION BY THE PHYSICIAN.

Items II, C–G, 3 to 6 inclusive (above) noted at each quarterly examination.

[For Professor Gies' address see next page. For joint discussion of the two papers, see page 131.]

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Studies of Internal Secretions in Their Relation to the Development and Condition of the Teeth.[1]

1. Effects of Thyro-parathyroidectomy and Thymectomy.

By WILLIAM J. GIES, Ph.D., Sc.D., New York, N. Y.,[2]
PROFESSOR OF BIOLOGICAL CHEMISTRY, COLUMBIA UNIVERSITY,

WITH THE COLLABORATION OF

SERGIUS MORGULIS, Ph.D., INSTRUCTOR IN BIOLOGICAL CHEMISTRY, COLUMBIA UNIVERSITY,
AND
WILLIAM A. PERLZWEIG, A.M., ASSISTANT IN BIOLOGICAL CHEMISTRY, COLUMBIA UNIVERSITY.

I. Introduction.

Mr. President, members of the Society, ladies and gentlemen:

FOR about three years we have been studying, under your auspices, the possible relation of salivary sulfocyanate to dental caries. Dr. Dunning gave you, a few minutes ago, a program of research in this connection that I believe could be followed to advantage if you cared to go farther along that line of investigation. I should be glad to cooperate with you in a continuance of the proposed sulfocyanate inquiry, although, as I suggested last May, "our results have taken sulfocyanate research out of the laboratory, so to speak, and put it into the dentist's chair." I am not competent to undertake the clinical study I have suggested (an outline of which Dr. Dunning has just read to you),[3] because I know too little of the clinical aspects of dentistry. For this

[1] To the substance of the senior author's address before the Dental Society of the State of New York (May 15, 1914), as given in the official stenographic report of it, there have been added various details which were suggested in only a general way by the speaker and promised for this published account of the research. Certain quotations from the writings of various authors, which were included in the oral report, have been omitted here, for the sake of brevity.

The experimental work was done in the Biochemical Laboratory of Columbia University at the College of Physicians and Surgeons, under the auspices of the Research Committee of the Dental Society of the State of New York, Dr. Wm. B. Dunning, chairman. The experiments on thymectomy, by our colleague, Dr. Pappenheimer, to which free reference is made, were conducted in the Pathological Laboratory of Columbia University, at the College of Physicians and Surgeons.

[2] The previous reports in this series, by Gies and collaborators, were published in the *Dental Cosmos:* (*1*) 1910, lii, p. 1141; (*2*) 1911, liii, p. 1324; (*3*) 1913, lv, p. 40; (*4*) 1914, lvi, p. 175.

[3] Dunning: See page 101.

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reason I suggested here, last May, that I could be of more service to you in a study of the relation of internal secretions to dental pathology. I am here, today, to present some phases of the latter subject for your attention.

When I was first invited, about five years ago, to inaugurate research on dental caries under the auspices of the New York Institute of Stomatology, it was suggested that problems pertaining to the saliva were probably the most important. I knew so little of the subject at that time that I readily accepted this opinion and formulated our research plans accordingly. As we proceeded with our work, however, study of the literature and reflection upon experimental facts and biological probabilities led me to suggest informally, before the end of the year (1909), that general nutritional relationships and conditions are probably important factors, directly and indirectly, in resistance and susceptibility to dental caries.

This opinion was almost unanimously opposed, however, by the dentists who were consulted, on the ground that enamel once formed is wholly excluded from nutritional influences and that it can be affected, after its formation, only by external influences, such as those exerted from the oral environment. Although I realized only too well my complete ignorance of dental matters, and that I could not oppose with confidence my mere belief against the opinions of those who were better informed than I was, nevertheless I felt impelled to say, in our *first report* (1910):

> That the *systemic condition* of the individual is an important factor in susceptibility to dental caries is a conviction that we cannot dismiss (p. 283). I presume it would be hard to show that enamel once deposited is modified directly by systemic conditions that prevail afterward, yet more astonishing things than that have been demonstrated. I feel that this possibility should not be dismissed. It should be investigated further (p. 288).[4]

The dissent from my expressed conviction that the internal secretory factors, which are so important in the calcification processes in general, are involved in particular in the development and condition of the teeth, including enamel, reminds me of the discouragement against which McCrudden proceeded when he undertook his important and fruitful studies of bone metabolism. Discussing, recently, the general lack of appreciation of the possibilities in bone metabolism, McCrudden said:

> This subject of bone growth is a very important one, to which very little attention has been given. When we remember that in all the various chronic rheumatisms, osteomalacia, rickets, osteitis deformans, osteoporosis, fractures, dwarfism, and faulty development, bone growth is involved, we see the importance of knowing the normal. And yet almost no one seems to have made an experimental investigation of the question of normal bone growth. Bone is generally considered a dead tissue, not undergoing metabolism once it is laid down. Only Cohnheim and Adami definitely face the question and express the opinion that bone does undergo a continuous process of absorption and resorption, and even with these two pathologists it is merely an opinion and not based on any definite experimental studies. Several years ago, while making chemical studies in various bone diseases, I began to study osteomalacia, and my findings threw some light on this whole question.[5]

Dr. McCrudden was altogether too modest in that concluding sentence—his results have thrown a *flood* of "light on this whole question." That dentin

[4] Lothrop and Gies: *Journal of the Allied Dental Societies*, 1910, v, pp. 283 and 288.

[5] McCrudden: *Transactions of the Fifteenth International Congress on Hygiene and Demography*, 1913, ii, p. 424.

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and enamel are similar to osseous tissue, from the standpoint of metabolic changeableness, is a very strong physiological probability.

In several succeeding reports to the New York Institute of Stomatology and the First District Dental Society of the State of New York, we referred, in one way or another, to the conviction that enamel may be subject, destructively at least, to systemic influences, although the reports were devoted primarily to other subjects. Thus, two years ago, (February 1912), again referring to this subject, I said: "The more I reflect on the available facts regarding dental caries, the more I believe in the *possible influences of systemic conditions* as factors in its onset and in its progress."[6] I then mentioned with intended emphasis, in justification of this old conviction, the interesting observations by Erdheim, on the dental effects of parathyroidectomy (to which we shall refer again today)—observations which had been described in detail a few months before, in one of the German journals of pathology.

In spite of preoccupation with other phases of dental research, under the auspices of your society and of the First District Dental Society of the State of New York, my conviction that general nutritional conditions are important factors in determining the resistance or susceptibility of teeth to caries grew steadily stronger as it fed upon the many pertinent biochemical data in the literature of nutrition, especially of the facts pertaining to the functions of the ductless glands. Accordingly, a year ago (1913) I had the honor here to suggest that you authorize us to undertake, under your auspices, an investigation of dental caries from the nutritional standpoint. With the approval of your Research Committee we have been proceeding, during the past year, with an *introductory chapter,* so to speak, to such research—with a study of the influence of internal secretions on the development and condition of the teeth.

That the members of this society may be inclined to feel skeptical about the desirability or fertility of such investigation is suggested by the following quotation from a paper by Bunting, in a recent issue of the *Dental Cosmos* (March 1913, lvi, p. 286). Speaking with apparent conviction and authority on the present status of knowledge of dental caries, Bunting said:

> It is pretty well considered that although it may be possible for the structure of the tooth to enter into the question to a certain extent, it is not looked upon as being responsible for the sudden and obscure changes in susceptibility, except by those few believers in the mutability of the tooth in response to general physiological change. So that investigation today is being focused upon the environment of the tooth, the saliva, ingested food, etc., seeking in them the changeable element which determines caries.

We happen to be among the "few believers in the mutability of the tooth in response to general physiological change," *i.e.* to systemic nutritional influences, especially destructive ones. We believe, also, that research in this field is as desirable and as fruitful as study in any other in dental science.

Before proceeding with a description and discussion of our experiments, I shall attempt to show you, through the medium of a long but co-ordinated series of quotations from the research literature on internal secretions, that the type of dental investigation we have

[6] Gies: *Journal of the Allied Dental Societies,* 1912, vii, p. 214.

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begun appears to be promising in high degree.

[At this point the speaker quoted extensively from various sections of the research literature on internal secretions, in order to show the probable value of such research, having been under the impression, from the attitude of Bunting and others, that dentists as a body doubted the bearing of this important phase of nutrition on dental physiology and pathology. The discussion of this report (pages 131–142) suggested so strongly, however, that apology for such work in dental biology is unnecessary, that the numerous citations for that purpose (some of which are referred to in the discussion) have been eliminated from this revised report. Since the date of the oral presentation of the original report (May 15, 1914), interesting reviews on this subject have been published in the *Dental Cosmos* by Grieves (August 1914, lvi, p. 954) and Pond (October 1914, lvi, p. 1155.)[7] The gist of much that was stated in our oral report appears in these two valuable reviews.]

As the sub-title of this report indicates, our experiments relate to effects of thyro-parathyroidectomy and thymectomy. The animals selected for the operations were rats, rabbits, and guinea-pigs. In collateral experiments on 16 puppies we aimed to determine some of the dental effects of artificial acidosis; also of under-nutrition with respect to calcium and phosphorus. The experiments on the dogs were in progress when the oral report was presented. The results in this particular connection will accordingly be considered in the next report.

II. Effects of Thyro-parathyroidectomy.

That the parathyroid glands are intimately involved in the co-ordination of some of the mineral matters in teeth has been indicated by the findings of Erdheim, Toyofuku, Fleischmann, Weichselbaum, Hohlbaum, and others. Results obtained by these investigators suggested that a study of the effects of parathyroidectomy might prove to be the most promising point of departure in our own inquiry.

The leading dental observations, by the investigators named above, were made in experiments on rats. The incisor teeth of rodents in general, by reason of the relatively large size, rapid development, and continuous growth of these teeth, are particularly well adapted to physiological investigation. Rodents grow rapidly to maturity. They breed early, often, and generously. With such animals it is possible to study dental physiology through many generations in a comparativelv short time. It is obvious that the younger the animals in such a study at the beginning of an experiment, all other things being equal, the greater the range of opportunity for the observation of effects on the development of the teeth.

Our experiments on thyro-parathyroidectomy were conducted on about 100 albino rats, 20 rabbits, and 15 guinea-pigs, most of which were very young when subjected to operation. Our main attention was given to the rats, the experiments on the rabbits and guinea-pigs having been supplementary.

[7] The senior author is preparing for presentation in a future report, or in a separate publication, the essentials of the data in the research literature on internal secretions that pertain to the development and condition of the teeth.

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It had been our original purpose to study the effects of *parathyroid*ectomy, but the successful removal of these tiny glands from young rats was much more difficult than we anticipated. The mere location of these almost imperceptible glandules in young rats is a perplexing matter, and their excision or destruction is attended by unusual surgical difficulty. The most valuable published data on the anatomy of the parathyroid glands in rodents that we have been able to find thus far were those given by Ivanoff[8] relative to a field mouse (*Mus sylvaticus*) and two guinea-pigs. The parathyroids in the former (adult) were 0.3-0.6 millimeter in length, and in the latter they were 0.275 millimeter (young) and 0.63 millimeter (adult) long. The exceptional difficulties in the way of complete excision of organs so minute, or their total destruction by cauterization, induced us to postpone our intended parathyroidectomy operations and to substitute preliminary experiments on *thyro*-parathyroidectomy. We believed, also, that extended experience in this direction would give us special preparation for the more difficult work involving parathyroidectomy.

Our *thyro*-parathyroidectomy operations were conducted under general ether anesthesia and with ordinary aseptic precautions. After making a median skin incision, the muscle exposed over the larynx was divided longitudinally with forceps, the lips of the wound retracted, and the underlying thyroids and accompanying parathyroids carefully freed, with delicate forceps, from their connective tissue attachments. The glands on both sides were then gently pulled out of place with one forceps, while the connecting blood-vessels were compressed and held with another. Hemorrhage under these conditions was usually slight, and could almost always be stopped immediately by pressure with a small wad of absorbent cotton. The skin and muscle were sutured with silk. The wounds, after the insertion of a few stitches, healed promptly in the survivors. The operation, from the time of initiation of anesthesia to the insertion of the last stitch, was usually completed in 20 minutes, often in 15 minutes, sometimes in less than 15 minutes.

Operations were performed on selected members of groups or litters, some or all of the remaining members of such groups serving as unoperated controls kept under the same dietary conditions and in the same environments.

Both before and after the operations the animals were kept in clean, comfortable, and commodious cages, which were stationed in a working-room in the laboratory where the temperature was moderate, chemical fumes were absent, and the animals could be promptly and repeatedly inspected. The diet was "mixed" in character and abundant in quantity, consisting of cereals, greens, meat, cheese, or bread, or several of these at one time, with water. Control animals grew rapidly and apparently to normal maturity on this diet.

1. *Experiments on Rats.*

Removal of the parathyroids from rats is usually followed promptly by death. A comparatively large number of animals must be subjected to this operation, therefore, in order to obtain a sufficient number of survivors for effective study of post-operative effects on

[8] Ivanoff: Contribution à l'étude des glandules parathyroïdes chez les rongeurs (cobaye et mulot); Thèse, Geneva, 1905.

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the teeth—a fact involving great regret for those who aim to do such work with the least possible distress to the animals affected.

The following protocol from our note-book, in its original free-and-easy phraseology, illustrates the course of events following *promptly fatal* double thyro-parathyroidectomy in rats:

RAT 55. Young, normal, well nourished, active. Double thyro-parathyroidectomy at 4.25 P.M., April 16, 1914. Weight: 45 grams.

4/16—	10.20 P.M.	O. K. up to now. Tremor beginning.
	11.00 "	Respiration rapid.
	12.00 M.	Ditto. Sitting up, but tends to lean back and topple over.
4/17—	12.30 A.M.	Same.
	—.50 "	General convulsion.
	—.52 "	General prostration at conclusion of convulsion.
	—.54 "	Unable to get up, though endeavors to do so.
	—.55 "	Hind legs completely paralyzed.
	1.00 "	Gradually resumed sitting posture; one hind leg stretched out behind—unable to pull it in and under.
	—.05 "	Now on all fours, but wabbling — unable to walk.
	—.10 "	Prostrate. Another violent spasm.
	—.15 "	Up again. Weak.
	—.25 "	Prostrate again—continuous convulsion, very violent.
	—.30 "	Prostrate. Breathing very rapidly. Struggles vainly to get up.
	—.40 "	Prostrate, with convulsions, since 1.25.
	—.45 "	Prostrate since 1.40. Now struggles hard to get up. Finally able to raise only head and tail. Respiration continues rapid.
	—.50 "	Same. Marked tremor in fore legs—nowhere else.
	—.55 "	Same. Raising head and tail again, apparently in an effort to get up.
4/17—	2.10 A.M.	Same continuously since 1.55.
	—.11 "	Violent convulsive jumps, as if trying to get up and run.
	—.12 "	Turns on back. All limbs extended and involved in general convulsion — rapidly intermittent.
	—.20 "	Prostrate. Limp. Weak general tremor.
	—.21 "	Another strenuous effort to arise, same as at 2.11.
	—.22 "	Ditto, several times. Violent tremor in fore legs.
	—.50 "	Complete prostration with intermittent convulsions since 2.22.
	—.51 "	Died in violent general-extension spasm. Weight: 39.2 grams.

The following protocol from the same note-book illustrates the course of events soon after *non-fatal* double thyro-parathyroidectomy:

RAT 37. Mature, normal, well nourished, active. Double thyro-parathyroidectomy at 3 P.M., April 7, 1914. Weight: 241 grams.

4/8 —	1.30 A.M.	Nothing so far, except labored breathing.
	12.30 P.M.	Ditto, but breathing is less labored.
4/9 —	4.30 "	Respiration more labored again.
	7.15 "	Ditto, increasing.
	10.30 "	Gentle general tremor. Breathing very hard.
4/10—	1.30 A.M.	About same.
	4.00 P.M.	Tremor disappeared slowly during day. Some respiratory distress still evident.
	11.00 "	Gentle general tremor. Breathing continues labored.
4/11—	11.00 "	O. K. all day.
7/11—	10.00 A.M.	Nothing noteworthy since 4/11, except evidence of gradual deterioration of teeth. One lower incisor has been broken off at gum line; the second, broken off half way from gum to tip. Upper incisors abnormally long. Chalky spots here and there on the teeth.

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7/18— 6.00 P.M. Gentle general tremor all day.

[*Sept. 1:* This rat (37) is alive at this date. General tremor was noted again on August 13th, 18th, 24th and 25th. Further reference will be made to this rat in the next report.]

Before the beginning of each experiment, the general condition of the animal, including its teeth, was carefully noted. Observations of this kind were made repeatedly on the survivors, during the progress of each experiment. After the death of an animal, a careful autopsy was made, and the findings noted.

After the conclusion of each autopsy, we took all the teeth and also the femurs and tibias from the animal. The teeth individually were carefully pulled out of place after the grip of the bones and membranes that held them had been broken by suitable paring and excision. Each tooth was cleaned with filter paper. Adherent muscle was cut from the leg bones, which were then gently scraped clean with a scalpel.

After free exposure to the air, for prompt superficial desiccation at room temperature, the teeth and bones were separately crushed and pulverized in a deep porcelain mortar. When, for any reason, we were unable to obtain all the teeth with both the femurs and the tibias from an animal, we used these materials from one side only, and proceeded on a 50 per cent. basis, in this way preventing any analytic irregularities that might have resulted from the use of masses that were not anatomically equivalent in kind and proportion.

After the pulverized material had been uniformly mixed and dried to constant weight at 100° to 110° C., an accurately weighed portion of it (practically all the material in each case) was decomposed in a large Kjeldahl flask, of Jena glass, with a mixture of equal parts of concentrated sulfuric and nitric acids (Neumann's method).[9] The clear, colorless, concentrated acid solution, freed from most of the mechanical excess of residual sulfuric acid, was then diluted to 500 cc., or one liter, and kept in tightly stoppered bottles. Calcium was determined, in duplicate, by McCrudden's method[10] in 100 cc. portions of each solution prepared in this way.

Our analytic data in this connection are summarized in Table 1. Additional data, pertaining to rats that survived after May 15, 1914 (the date of this report), will be given in our next communication.

The analytic data in Table 1 suggest the chemical conclusions, on the effects of our double thyro-parathyroidectomies, that are indicated by the summary on p. 114), from which we see at a glance that the teeth of *seven* operated rats contained less calcium than the teeth of the corresponding control rats; but the teeth of *six* operated rats contained more calcium than the teeth of the corresponding control rats. The average difference for the former was −1.62%; for the latter, +0.66%.

The bones of *four* operated rats contained less calcium than the bones of the corresponding control rats; but the bones of *two* operated rats contained more calcium than the bones of the corresponding control rats. The average

[9] Thierfelder: Hoppe-Seyler's Handbuch der chemischen Analyse, 8th ed., Berlin, 1909, p. 539.

[10] McCrudden: *Journal of Biological Chemistry*, 1911, x, p. 187. Neuberg: Der Harn, sowie die übrigen Ausscheidungen und Körperflüssigkeiten, Berlin, 1911, i, p. 168.

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TABLE 1.

DATA PERTAINING TO ALBINO RATS SUBJECTED TO THYRO-PARATHYROIDECTOMY, WITH CORRESPONDING "CONTROL" DATA.[1]

Rat. No.[2]		Control (C), or operated (O).	Weight.[3] Beginning. Grams.	Weight.[3] End. Grams.	Period of survival: Days.[4]	Percentage of calcium, as Ca (*not* CaO). Teeth.	Percentage of calcium, as Ca (*not* CaO). Bones.[5]	Remarks on symptoms, condition, cause of death, etc.[6]
I.	7	O	85	. .	19	27.71	. . .	No tremor or convulsions observed.
	8	O	106	126	57	26.83	24.30	Etherized.[7] No observed effects of surgical operation.
	10	C	121	137	57	28.02	24.97	Etherized.
II.	13	O	45	36	63	28.08	16.15	Partial paralysis of legs and occasional convulsions. Bones "soft."
	15	C	44	72	64	27.90	17.60	Etherized.
III.	26	O	32	25	22	24.71	16.23	Severe tetany and paralysis.[8] Bones "soft."
	29	O	44	40	12	28.08	. . .	Severe tetany.
	30	O	34	. .	5	24.06	. . .	Severe tetany occasionally.
	34	C	56	76	22	26.72	20.60	Etherized.
	36	O	89	. .	2	27.05	20.61	Severe tetany. One violent convulsion.
IV.	38	O	240	208	2	27.33	. . .	General tremor. Convulsive jerks.
	40	O	127	102	27	27.35	23.78	Slight tremor occasionally.
	42	O	229	200	28	28.34	25.41	No symptoms.
	44	O	131	72	11	28.38	25.28	Severe tetany.
	45	C	122	101	12	27.73	24.55	Etherized. Open tumor on right hind leg.

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V.	50[9]	O	50	47	1	22.81	17.91	Violent convulsions. Dead in seven hours.
	51	O	58	37	17	27.49	21.08	Severe tetany with marked paralytic effects.
	52	C	44	30	14	26.67	. . .	Natural death.

[1] Additional data pertaining to these rats, such as the condition of the teeth, will be given in the next annual report, with the results of work that could not be completed before the date of the meeting at which these experiments were described. (At autopsy it was found that all the thyroidal and parathyroidal tissues at the laryngeal sites of these glands had been extirpated or practically so. The possible occurrence and functionation of accessory parathyroid tissue was considered but not investigated. In the proposed histological extension of our work, this phase of the subject will receive experimental attention.)

[2] The missing numerals (to 100) pertain to rats that died within twenty-four hours after operation, or survived after the date of the meeting at which this report was presented. It was assumed for some time that rats which succumbed within twenty-four hours after the operation died before any appreciable chemical changes could occur in the teeth. The data for rat 50 suggest that possibly this assumption was unwarranted. (See table footnote 9.) Further attention will be paid to this particular point.

[3] Blanks in the series of data for body weights are due to oversights. "Nearest" whole numbers for body weight are recorded.

[4] In the case of the "control" animals, the numerals in this column indicate numbers of days from the day of operation on the first animal of the group to the day when the "control" animal was put to death by ether anesthesia. "Nearest" whole numbers for these days are recorded.

[5] Blanks in this column indicate either that the values will not be available or will be supplied with the supplementary data in the next annual report.

[6] Only the most significant facts are suggested in the "remarks." The details will be amplified in the next report.

[7] "Etherized" is used conveniently for the phrase "killed with ether by inhalation."

[8] Unless otherwise qualified, the designation in this column of a symptom implies its frequent or prolonged occurrence.

[9] This rat (50) was originally a "control," but as 52 appeared to be a normal survivor in this group, and most of its operated associates succumbed, we changed rat 50 to the "operated" subdivision. During the week prior to the day of operation, the weight of this rat increased 2 grams.

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Summary.

I—A. Lower degree of calcification of both teeth and bones:
  a. Rat 8 compared with rat 10—1.19% and 0.67% respectively.
  b. " 26 " " " 34—2.01% " 4.37% "
  c. " 40 " " " 45—0.38% " 0.77% "

B. Lower degree of calcification of teeth (no comparable data on bones).
  a. Rat 7 compared with rat 10—0.31%.
  b. " 30 " " " 34—2.66%.
  c. " 38 " " " 45—0.40%.
  d. " 50 " " " 52—4.36%.

C. Lower degree of calcification of bones, but not of teeth.
  a. Rat 13 compared with rat 15—1.45%.

II—D. Greater degree of calcification of both teeth and bones.
  a. Rat 42 compared with rat 45—0.61% and 0.86% respectively.
  b. " 44 " " " 45—0.65% " 0.73% "

E. Greater degree of calcification of teeth, but lower degree of calcification of bones:
  a. Rat 13 compared with rat 15—0.18%. (This difference is too slight for any emphasis, however.) (See I, C.)

F. Greater degree of calcification of teeth (no comparable data on bones).
  a. Rat 29 compared with rat 34—1.36%.
  b. Rat 51 " " " 52—0.82%.

G. Greater degree of calcification of teeth, but no effect on bones.
  a. Rat 36 compared with rat 34—0.33%.

difference for the former was −1.82%; for the latter, +0.80%.

Further summarization of the above average percentage data shows these differences more conveniently below:

Operated Rats compared with Control Rats.

Degree of calcification.	Teeth.		Bones.	
	No.	Percentage of Ca (av. difference).	No.	Percentage of Ca (av. difference).
Lower degree of calcification	7	−1.62	4	−1.82
Greater degree of calcification	6	+0.66	2	+0.80

The *general average* data for percentage calcium contents in the teeth and bones are the following:

	Teeth.	Bones.
Control rats	27.41%	21.93%
Operated rats	26.75%	21.19%
Difference	0.66%	0.74%

If we were seeking to verify, from the biochemical standpoint, the results obtained by Erdheim and others from the histological point of view, we might be expected to assume, with bias in that direction, that these percentage differences support Erdheim's conclusions. But we have attempted neither to verify Erdheim's findings nor to prove them incorrect—we have sought simply the facts in the case. Our data require, we think, the frank conclusion: *Nothing proved one way or the other!* With such openmindedness we shall extend these particular experiments and report further, a year hence, the data that additional experience and further work may afford.

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The nature of the foregoing general inference, and the purpose based thereon, make it useless to discuss the chemical data in Table 1. But before proceeding with the rest of our report, we wish to allude to the fact that our control animals were not as numerous as our cumulative experience has shown they should have been, so far as determinations of calcium content in teeth and bones are concerned. The loss of weight in two of the control rats (45 and 52) suggests that, in spite of the abundance of food available to them, they were poorly nourished for one reason or another, and probably, therefore, were not suitable "control" animals. The tumor in rat 45 (which had not been observed when the animal was selected), and the disease that caused the premature death of rat 52, may explain the obvious malnutrition in each. These disorders emphasize, nevertheless, the possible unreliability of these rats for "control" purposes in our calcium work.

The loss of weight in practically all the operated animals is a matter that requires, and will receive, special attention in our future experiments in this particular connection, involving, as it may, tissue deficiency in calcium (and other constituents) *from loss of appetite,* with consequent diminished consumption and absorption of food (calcium), rather than from inability to assimilate, into the bones and teeth, the calcium that may be available in the alimentary tract and in the blood. Such animals, both operated and control, should evidently be studied from quantitative nutritional standpoints with foods *known* to be particularly rich in *assimilable* calcium and also with diets very deficient in such calcium. The animals received a diet that is ordinarily very nourishing, and we relied in a general way on a normal outcome in this respect. Our results require the skepticism on this point, however, that we are indicating.

We are also doubtful, *now,* of the adequacy of our chemical procedure. We took *all* the teeth in each instance. Probably the incisor teeth alone would show results more strikingly. We used *whole teeth* and *whole bones,* after pulverization and *desiccation* to constant weight; but differences in the composition of dental pulp and bone marrow may have influenced irregularly our percentage data for calcium. A "water-free basis" may not be uniform enough to show certain comparative differences in calcification. Probably preliminary removal of substances soluble in water or in ether, or in both, would afford more definite and uniform bases for estimations of comparative degrees of calcification. We may find it necessary to rely solely, in this connection, on analyses of *ash* from the teeth and bones.

It is probable, also, that careful note must be made of sex differences, and that "control" rats must be of the same sex as those with which they are experimentally compared. Close relationship in a given litter, freedom from disease, identical states of nutrition, equal weights, similarity in activity, and close general resemblances are important experimental considerations, but not sufficiently inclusive. *"Segregation* of the sexes" may likewise be required in all such experiments, especially in view of the probable interference with calcification of the teeth in growing pregnant animals.

These considerations, and others of equal importance, might now be ignored, as they were by us at the beginning, if

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our results had been striking enough to warrant the belief that biochemical differences due to thyro-parathyroidectomy "covered" the differences due (probably) to such physiological variations and disparities as are suggested above. But it is plain that the biochemical variables to which we have just referred, and others like them, must be *experimentally* considered in detail, and controlled before further progress in exact knowledge can be made in studies of this kind. All our doubts in these and similar relations will be resolved, we hope, by the chemical and histological experiments now in progress with that end in view.

We have not overlooked the possible counteracting influence of thyroidectomy when it accompanies parathyroidectomy. This phase of the matter will also be given due attention at an early date. Our views on this phase of the subject were intimated in one of the opening paragraphs of this section of our report.

[Certain additional facts bearing on reasons for uncertainty regarding interpretation of the data pertaining to these experiments on rats are mentioned on page 124.]

2. *Experiments on Rabbits and Guinea-pigs.*

Our data for rabbits and guinea-pigs add nothing of significance to the results for the rats. Accordingly, our results for these animals will be withheld for communication with the findings in additional experiments on such animals.

III. Effects of Thymectomy.

During the progress of our experiments on the effects of thyro-parathyroidectomy, we learned that Dr. Alwin M. Pappenheimer, associate in pathology at the Columbia Medical School, was studying, in the pathological laboratory, the effects of thymectomy on bones and teeth in albino rats. He was engaged in this work with special reference to the validity of the positive conclusions in this connection that were recently published by Klose—conclusions which were at variance with negative deductions previously stated on this subject by Dr. Pappenheimer. It was our good fortune to be able to co-operate with Dr. Pappenheimer in this work, from the standpoint of chemical analysis of some of the bones and teeth of a number of his most valuable rats; and to profit greatly, besides, in all our work on internal secretions in their relation to ossification and dentition, from association with Dr. Pappenheimer in this particular research, which he inaugurated independently.

[Most of the analytic figures in Table 2, and the collateral data, were available last May, and were stated in our oral report. The recent publication by Dr. Pappenheimer,[11] and by the senior author in association with Dr. Morgulis,[12] of the details of this work on thymectomy, enables us to add to this revised report much that was learned in this relation since last May, and which was detailed in the two papers mentioned above. Accordingly, with Dr. Pappenheimer's consent, we make free use, below, of the phraseology of sections of the papers by him, and by Morgulis and Gies. We are greatly indebted to Dr. Simon Flexner, editor of

[11] Pappenheimer: *Journ. of Exper. Medicine*, 1914, xx, p. 477 (November).

[12] Morgulis and Gies: *Ibid.*, p. 499 (November).

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the *Journal of Experimental Medicine,* for permission to use the accompanying plates, which were originally published in that journal as a part of Dr. Pappenheimer's paper.]

Dr. Pappenheimer introduced his paper with the following comment:

In a previous paper[13] dealing with the effects of extirpation of the thymus of white rats, the writer reached the conclusion that total removal of the gland at an early age was not necessarily followed by modifications of the normal development, nor by characteristic changes in the skeletal system.

While that article was in press, there appeared a short paper by Klose embodying results at variance with these observations. Klose described briefly the results of thymus extirpations in pigs, goats, rats, and chickens. The rats were operated upon on the fourteenth day after birth. Some of the animals showed no results from the operation, and this failure is ascribed by Klose to the presence of accessory tissue within the thyroid gland. In rats without such accessory thymus tissue, death followed after eight to ten weeks, with symptoms of cachexia thymopriva. The bones in these rats showed severe rhachitic changes. Most striking were the changes in the ribs, in which there was found a typical rosary, such as is seen in human rickets. Microscopically there was an extreme widening of the zone of growing cartilage, failure of calcification in the preparatory zone, great irregularity and distortion of the cartilage columns, and their penetration by bloodvessels. Klose pictures further a dense spongiosa composed in the region of the costochondral junction almost wholly of osteoid, and an accompanying transformation of the marrow into "Fasermark." Similar but less striking changes were found also in the femora.

These conflicting observations induced Dr. Pappenheimer to present the additional data in his second paper on this subject.

It has been suggested [he wrote] that[14] negative results might be due to unrecognized lobules of accessory thymic tissue which had undergone delymphoidization or other involutional change, making their identification difficult. While it is hard to refute this criticism absolutely, it may be said that in those cases in which accessory tissue has been present, there has been no difficulty in recognizing it as such and in differentiating it from lymphoid tissue. Further, the failure of such minute thymic rests to undergo hyperplasia, in itself suggests that they are of no great functional significance.

Dr. Pappenheimer's operative technique, as "fully described in the previous study," was conducted as follows:

The removal of the thymus was performed upon young rats, ranging in weight from 10–25 grams. When possible the age was accurately determined, but in some litters it had to be estimated. Probably none of the operated animals were over twenty-one days old when the gland was removed. Two or more rats from each litter were reserved as controls, and kept in the same cage as the operated rats.

The operation was performed aseptically under ether anesthesia. A median incision was made in the lower part of the neck and continued over the upper half of the thorax. The sternum was then split as nearly as possible in the median line as far as the fourth or fifth intercostal space, and the edges were retracted. The triangularis sterni muscle was separated, exposing the thymus, which was carefully dislodged from below upward with fine blunt forceps, and removed, when possible, without laceration or separation of the two lobes. The friability of the gland made this the most difficult part of the operation. The sternum and skin were sutured with silk. Healing in almost all cases took place rapidly and without suppuration. It was found advantageous to use a simple positive pressure apparatus, to prevent collapse of the lung when the pleura was accidentally injured, and to institute artificial respiration when necessary.

In the earlier experiments the control rats were also subjected to etherization and the sternum was incised without removal of the thymus. It was found later that the operation had practically no immediate effects, and this precaution was therefore considered unnecessary.

After the end of the nursing period, the rats were fed principally on bread, sunflower seed, and greens. Meat was not given, and the feeding of milk was given up, since it

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[13] Pappenheimer: *Ibid.*, 1914, xix, p. 319 (April).

[14] Personal communication from Prof. J. Salkind.

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seemed to favor the spread of infection. The operated rats together with the controls were kept under observation for varying periods up to six months, and were then killed. They were weighed weekly.

At autopsy the organs of the neck and thorax were removed together. After fixation the lungs and lower half of the heart were dissected off, and the rest of the tissue was embedded in paraffin and cut in series of 10 micra in thickness. In the earlier litters each section was mounted, but later only every tenth section was examined.

The completeness of the operation and the possible presence of accessory thymic tissue in the thymectomized rats was controlled in each case by an examination of serial sections of the entire neck organs, including the thyroid, and the upper half of the thoracic organs. The teeth and bones were decalcified in 5 per cent. nitric acid. The staining methods included Morpurgo's modification of Schmorl's thionin-picric acid method, which differentiates even in completely decalcified specimens between osteoid and completely calcified bone.

The following abbreviated protocols and comment are quoted from Dr. Pappenheimer's last paper (page 479 *et seq.*):

1. *Animals in which complete thymectomy was not followed by alterations in growth, nutrition, or skeletal system.*

LITTER U. This litter consisted of seven rats, four of which were thymectomized on July 28, 1913. During the following weeks mother and young received protective inoculations of a *B. enteritidis* vaccine, since fatal infections with this organism were prevalent at that time.

Rats U_1, U_3, U_5 and U_6 (see Table 2) were kept under observation until January 28 and 29, 1914, when they were killed with ether. The bones and teeth were reserved for chemical examination and were not studied histologically. There were no gross changes. (See Table 2, page 122.)

LITTER O. This litter consisted of six rats, upon four of which thymectomy was performed on July 17, 1913. During the following weeks all the animals received prophylactic injections of a vaccine of *B. enteritidis*. With the exception of one rat, O_4, which developed bloody diarrhea and died after four weeks, all the rats of this litter gained steadily in weight and remained healthy. Rats O_1, O_2, and one of the controls, O_3, were killed on Nov. 15, 1913, 120 days after the operation. Rat O_5 and the remaining control, O_6, were killed eleven days later. In none of the operated rats were there found rests of thymic tissue or accessory glands. *A careful microscopic examination of the bones and teeth showed no abnormal conditions.* The *calcification of the dentin of the incisors* is shown *for comparison with that in rhachitic rats*, in Figs. 1a and 1b, Plate 1, page 128.

2. *Litters in which both operated animals and controls showed lesions of the teeth and bones.*

LITTER X. This litter consisted of six rats, four of which were operated on Oct. 24, 1913, the remaining two being kept as controls. The estimated age at the time of operation was sixteen days. Data pertaining to four of these rats follow:

RAT X_2. On Nov. 12th a small fragment of thymus from rat X_6 was implanted beneath the skin of the abdominal wall. The small nodule disappeared after a few days, and no remains of it were found at autopsy. There were no convulsive symptoms or other evidence of illness following the implantation. The rat remained well, but was behind the remaining animals of the litter in size and weight. It was allowed to live 151 days after thymectomy, and was then killed together with control rat X_5.

Autopsy: Poorly nourished, eyegrounds pale, slight exophthalmos. Internal organs normal. In the thymic region there were five or six lymph nodes and fat; no gross remains of thymus.

The *ribs* show fairly marked deformity. The zone of growing cartilage is broad and translucent, and there is distinct nodular swelling at the junction of cartilage and bone. There are also several opaque, fusiform, whitish swellings along the shafts of the ribs. The *femur* is 5 mm. shorter than that of X_5, the control, and thicker, but not noticeably deformed. *The teeth show no gross changes, aside from a notching of the cutting surface of the upper incisors.*

Microscopic examination: In the *ribs* the zone of proliferating cartilage cells is about 0.4 mm. in width (normal width about 0.1 mm.). By actual measurement with the projection apparatus, it is found to be about six times as broad as that of a normal control. It is composed of fourteen to sixteen swollen cells. The margin is uneven and irregular

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columns and groups of cartilage cells in which the ground substance stains like osteoid are found amongst the trabeculæ of the spongiosa. These are wide, irregular in their arrangement, and composed in the neighborhood of the epiphysis almost wholly of a homogeneous osteoid. Only the central portions take a bluish stain and show typical bone structure. The marrow spaces are narrow, and the marrow is fibrous. The osteoblasts are very high and conspicuous. The cortex is broad, and the marrow cavity of the shaft correspondingly reduced. The nodular swellings seen in the gross correspond to localized thickenings of the compact bone. The epiphyseal cartilage of the femur is very convoluted, and there are masses of swollen cells projecting among the trabeculæ of the spongiosa. The width of the proliferating zone varies. It is from six to twelve cells deep. The spongy bone is dense, the marrow spaces reduced in width.

The *incisor teeth* show pronounced changes in the calcification of the dentin, both in the upper and lower incisors. The essential feature is a defective and irregular calcification, with ingrowth of bloodvessels into the calcium-free dentin. On the concave side of the upper incisor there are alternating striæ of calcified and calcium-free dentin. No lesions are found in the enamel epithelium. The *changes in the teeth* are illustrated in Figs. 2a, 2b, 2c, and 2d, Plate 1.

RAT X_3. Control, male. Killed with ether at the same time as X_2.

Autopsy: Well nourished, apparently healthy rat. No gross lesions of internal organs, ribs, femora, or teeth. Testes small, undescended.

Microscopic examination: Two *ribs* were examined. One shows much more pronounced changes than the other. The lesions in the more severely affected rib are identical with those described in the rib of X_2. The width of the growing cartilage is increased, and the disarrangement of the cartilage cells is extreme. There is an excessive amount of spongy bone in the region of the epiphysis, the trabeculæ having a wide osteoid margin. The marrow is fibrous in character. The *femur* also shows similar changes.

The *incisors* show a marked defect in the calcification of the dentin, with ingrowth of cells and bloodvessels from the odontoblast layer, as shown in Figs. 3a, 3b, 3c, and 3d, Plate 2. The enamel epithelium of the upper incisors is interrupted at one point and folded in upon itself. The enamel in this region has fallen out.

The remaining rats of the litter, X_3 and X_4, and the control, X_6, were killed 156 days after the operation.

RAT X_3. Large, well-nourished male. Nothing abnormal noted in viscera, bones, or teeth. Many large lymph nodes in substernal region, but no gross remains of thymus.

Microscopic examination: In the *upper incisors* the calcification of the dentin is *practically complete* on the convex surface throughout the whole length. Near the base of the tooth the border of the calcified portion is slightly wavy, and there are a few ingrowing bloodvessels. The concave edge also shows good calcification of the dentin, although in the middle portion there are a few calcium-free streaks, and in places the calcium is deposited in globular form. The odontoblast layer is well formed through the entire extent of the pulp cavity on both sides. The enamel is wanting in the sections, but the ameloblasts are normal.

Normal chondrocostal junctions in several *ribs* examined. There are four to eight growing cartilage cells, regularly disposed. The osteoblasts are well formed. There is no excess of osteoid tissue.

RAT X_4. Thymectomy.

Autopsy: Fairly well-nourished female. No changes in internal viscera. No macroscopic remains of thymus. Definite lesions are seen in the *ribs*, similar to those described in X_2. The chondrocostal junctions are swollen, and there is sharp angulation of the lower ribs. The zone of growing cartilage is broad, and the adjacent part of the shaft for a distance of about 2 mm. is grayish white and soft. Four of the ribs show on the pleural surface, about 1 cm. from the junction with the cartilage, pearly, cartilaginous swellings. *Teeth and femora show no gross changes.*

Microscopic examination: The upper *incisors* show changes similar to those described in rats X_2 and X_5, but somewhat less marked. The defective calcification of the dentin, on the convex surface, near the base of the tooth, is marked, about one-third of the entire width being entirely calcium-free. In the middle portion, about two-fifths of the dentin is uncalcified. Here, and also towards the tip, the calcium is deposited in laminæ. There is an abundant ingrowth of capillaries from the odontoblast layer. On the concave side, near the base, half the dentin is calcium-free. Toward the middle and distal portion the calcification is still more incomplete, and in the form of alternating calcium-free and calcium-containing layers. The lower incisors show similar changes, especially marked on the concave surface.

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The growing cartilage of the *ribs* presents an even convex surface towards the shaft. The rows of cartilage cells are six to ten cells deep. The spongiosa is composed of very broad trabeculæ with wide osteoid zones, and high osteoblasts. The pearly swellings observed in the gross correspond to localized thickenings of the compact bone.

The zone of growing cartilage of the *femur* at the lower epiphysis is convoluted and slightly increased in breadth, but not markedly irregular. The spongiosa is formed of coarse trabeculæ with a relatively broad osteoid zone and distinct osteoblasts.

RAT X_6. Control.

Autopsy: Large, well-nourished rat, showing no changes in the internal organs. There is slight beading of the ribs, with a broad grayish zone adjacent to the cartilage. The femora and teeth appear normal.

Microscopic examination: In the upper *incisors* the odontoblasts are well formed, extending through the entire length of the pulp. Calcification of the dentin is not abnormal, save that the odontoblast layer is rather wavy. The uncalcified predentin is narrow.

Ribs and femur show nothing abnormal.

LITTER Y. This litter, consisting originally of eleven rats, was born in the laboratory of stock animals, all the rats previously studied having been obtained from Granby, Mass. The rats were undersized, and stood the operation poorly, only three thymectomized and three controls surviving.

RAT Y_2. Thymectomized Oct. 27, 1913. Weight 10 gm. Gained slowly and remained undersized. Killed on Mar. 13, 1914, 137 days after extirpation of the thymus.

Autopsy: Internal organs normal save for suppurative foci in the lower lobe of the right lung. Testes large and descended. No alterations of the bones and teeth were recorded.

Microscopic examination: The line of growing cartilage of the *ribs* is broad, with a convex, irregular surface directed towards the shaft. It is composed of eighteen to twenty cells in rows, with masses of cartilage cells projecting amongst the trabeculæ of the spongiosa. These are numerous, broad, with a wide osteoid margin, and high conspicuous osteoblasts. The marrow spaces in the region of the cartilage are narrow, the vessels hyperemic and surrounded by spindle cells.

Upper epiphysis of *tibia:* No definite rhachitic changes. The zone of growing cartilage is slightly narrower than that of the control. The cells are regular in their arrangement, as are the trabeculæ. Bone formation is very active. The osteoid zone about the trabeculæ is slightly increased in width. This is especially clear in the epiphyseal center of ossification.

The epiphyseal line of the *femur* is regular on the whole, but there are a few projections of cartilage amongst the trabeculæ of the spongiosa. The osteoid is increased in amount.

The calcification of the dentin of both upper and lower *incisors* is somewhat defective, but there is no vascularization of the calcium-free dentin. The enamel epithelium is not altered.

Much more striking were the skeletal and dental changes in rat Y_8, the protocol of which follows.

RAT Y_8. Thymectomy on Nov. 1, 1913. Weight at operation 14.6 gm. Following the operation, and until the rat was killed on Mar. 2d, 126 days after extirpation of the thymus, it lagged far behind the remaining rats of the litter in weight and size. The hair was rough and sparse; the head seemed relatively large as compared with the body. On Jan. 17th it was noted that the upper *incisors* were very long and thick as compared with the lower, which were small and delicate. On Feb. 28th the right upper incisor was broken off just beyond its emergence from the gum.

Autopsy: Poorly nourished, stunted male. Weight 42 gm. The internal viscera were normal, with the exception of the right lung, which was atelectatic in its upper portion. No gross remains of thymus. The thorax is greatly deformed by the presence of a deep groove along the line of the chondrocostal junctions. From the pleural surface there are seen, especially on the lower ribs, nodular protuberances at corresponding points. There is thus a pronounced rhachitic rosary. The bones of the lower extremities are softer and more pliable than normal, and there is distinct swelling about the epiphyses of the knee-joints.

Cultures from the heart blood and spleen on slant agar remained sterile.

Microscopical examination: The upper *incisors* were sectioned through the fractured stump. The pulp is hyperemic and largely necrotic. The calcification of the dentin is both irregular and incomplete. The line of junction between odontoblasts and predentin is sinuous, and in many places the odontoblast cells penetrate the uncalcified tissue. The calcified portion of the dentin is laminated, the calcium being in the form of coarse globules. In another section there are al-

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ternating zones of calcified and calcium-free dentin. Isolated cells and occasionally capillary loops reach the outer, imperfectly calcified zone. Sections through the unfractured upper incisor show also defective calcification. Near the root, there is the same stratification as in the fractured tooth. In the middle portion, just after it emerges from the socket, the section passes outside the pulp canal. In this region there is a large area of calcium-free dentin. Near the convex surface, within the calcified strata, there are a number of globular yellowish masses. In sections stained with thionin-picric acid, it is seen that the dentin filaments are interrupted at the site of these globular deposits. Near the root, the congested pulp vessels penetrate the uncalcified dentin as papillary ingrowths. About one-half of the dentin on the convex surface of the lower incisors is free from calcium. The odontoblasts are poorly formed and irregular. There is no marked ingrowth of bloodvessels. On the concave side the calcification is still more imperfect.

The zone of growing cartilage of the *humerus* at the lower epiphysis is widened, and irregularly prolonged amongst the trabeculæ. These are very broad and the marrow spaces correspondingly narrow. The trabeculæ are composed in the neighborhood of the epiphysis of a narrow, ossified central portion, distinctly laminated, with angular bone corpuscles, surrounded by a very broad homogeneous, osteoid zone in which the nuclei of the bone corpuscles are larger and more rounded, and quite irregularly distributed. The osteoblasts are conspicuous and well formed. There is no increased osteoclastic resorption. The changes at the lower epiphysis of the *femur* are similar in character, but more pronounced than in the humerus. Numerous sections from four different *ribs* show similar changes. There is marked deformity at the junction of cartilage and bone, where the rib measures 3 mm. in diameter. The junction of the cartilage with the shaft is in most places sharply marked off. There is a large central mass of hypertrophic cartilage, in some places twenty-five cells deep, and two shorter lateral spurs. Near the pleural surface, smaller irregular groups of cartilage cells are surrounded by osteoid-staining matrix. The adjacent cancellous bone is composed of stout trabeculæ formed entirely of pink-staining osteoid, separated by very narrow clefts and spaces. They are ranged, in the region where the rib is sharply angulated, at right angles to the cartilage columns. The distribution of the bone corpuscles through this mass of osteoid is haphazard. Farther along the shaft, the trabeculæ of the spongy bone follow the long axis of the rib. They are all greatly thickened, as is the corticalis, and well calcified only in their central portions. In thionin-picric acid-phosphotungstic acid-stained preparations, the broad osteoid, blue-staining zone appears with great distinctness. The marrow cavity is much reduced in width. Near the epiphysis the marrow is fibrous; farther along it has the normal lymphoid appearance.

Two control rats of the litter, Y_7 and Y_9, showed alterations in the teeth and bones comparable with those observed in the thymectomized rats, though somewhat less pronounced. A third control, Y_{10}, which had complete visceral transposition, was not histologically examined.

RAT Y_7. Control. Killed Apr. 7, 1914. Poorly nourished female, weighing 115 gm. Internal organs show no lesions, with the exception of the lung. The right middle lobe in converted into a mass of cheesy abscesses, separated by scar tissue. The *ribs* show slight beading at the chondrocostal junctions, with angular deformity in the region of the diaphragmatic attachment. The zone of growing cartilage is broad. No gross changes in *femora* or *teeth*.

Microscopic examination: In the upper *incisors* calcification of the dentin is imperfect, both on the convex and on the concave surfaces. The odontoblast layer is broad, but ill defined, and on the concave side cells are seen to penetrate the calcium-free dentin for varying distances. Both surfaces of the lower incisors show alternating layers of calcium-containing and calcium-free dentin. The calcium is deposited in the form of coarse globules.

The growing cartilage of the *femur* is narrow, being composed of only two to four rows of cells in the lower epiphysis. Both in the compact and in the spongy bone, the osteoid margin is very broad and distinct, especially about the perforating vessels. The *ribs* show no deformity in the sections examined, but there is a distinct increase in the width of the osteoid zone about the trabeculæ.

RAT Y_9. Control, male. Killed Mar. 13, 1914. Weight 118 gm. There were no lesions of the internal viscera. The alterations of the *teeth* were insignificant (slight lamination of the calcium on the convex surface of the lower incisors), but there was distinct irregularity and thickening of the cartilage at the lower epiphysis of the *femur* and at the upper epiphysis of the *tibia*. The single *rib* examined was practically normal.

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TABLE 2.

DATA PERTAINING TO ALBINO RATS SUBJECTED TO THYMECTOMY, WITH CORRESPONDING "CONTROL" DATA.[1]

Rat.[2]	Thymectomy.	Duration of experiment.	Weight at death.	Rhachitic lesions.		Percentage data.[3]						Remarks.
						Calcium.		Magnesium.[4]		Phosphorus.[4]		
		Days.	Grams.	Teeth.	Bones.	Teeth.	Bones.	Teeth.	Bones.	Teeth.	Bones.	
U_1	Complete	185	97	None	None	27.48	22.61	1.51	0.60	15.28	10.90	No histological examination of bones or teeth.
U_3	"	186	111	"	"	28.97	24.01	. .	. .	. . .	. . .	Ditto.
U_5	Control	186	116	"	"	27.93	23.16	. .	. .	. . .	. . .	Ditto.
U_6	"	185	152	"	"	28.29	22.74	1.91	0.52	15.80	12.45	
X_3	Incomplete	156	196	Slight	"	26.51	21.37	. .	. .	. . .	. . .	
X_4	Complete	156	110	"	Moderate	28.61	20.89	. .	. .	. . .	. . .	
X_5	Control	151	143	Marked	Marked	. . .	18.92	. .	1.35	. . .	11.87	Minute thymus, IV.
X_6	"	156	180	Slight	None	28.12	22.84	. .	. .	. . .	. . .	
Y_2	Complete	150	85	Moderate	Marked	28.53	17.85	3.48	0.92	19.78	9.63	
Y_7	Control	168	115	"	Moderate	27.09	23.14	. .	. .	. . .	. . .	
Y_9	"	150	119	"	"	27.23	18.68	. .	. .	. . .	. . .	
W_3	Complete(?)	192	240	None	None	28.31	24.40	. .	. .	. . .	. . .	Series of neck organs incomplete.
W_4	Control	192	240	"	"	28.99	23.75	1.54	0.53	17.12	. . .	
Z_1	Incomplete	166	145	Very slight	"	28.43	22.29	. .	. .	. . .	. . .	
Z_4	Control	166	128	None	"	27.84	23.18	. .	. .	. . .	. . .	

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50[5]	Stock	. .	.	Slight	Marked	26.44	28.41	. . 2.62	. .	13.88	Inoculated with bone marrow from spontaneously rhachitic rat.
53[5]	"	. .	90	Marked	Moderate	. . .	18.15	2.79	. .	. . .	Spontaneous rhachitis.
55[5]	"	. .	75	"	"	25.49	20.66	. . 1.34	. .	9.30	Inoculated with bone marrow from spontaneously rhachitic rat.

[1] This table is taken, in the main, from the paper by Morgulis and Gies. The data for magnesium and phosphorus have been added since the publication of that paper.

[2] The percentage data pertain to the elements, not to oxids, and relate to substance dried to constant weight ("water-free").

[3] The rats of the W and Z litters were not mentioned in the protocols.

[4] The lack of available material prevented more numerous determinations of magnesium and phosphorus.

[5] These numerals, though they duplicate the corresponding numbers for the thyro-parathyroidectomy experiments, are independent of the latter.

3. Unoperated animals, from "stock" cages, that showed lesions of the teeth and bones identical with those in group 2.

To the foregoing protocols of thymectomized and control rats may be added the brief description of two unoperated rats taken from the stock cages, which showed lesions in the bones and teeth identical with those described above:

The first of these (rat 50) was greatly stunted; there was a marked disproportion between the size of the head and that of the body. The approximate weight was 50 gm. The hair was rough and sparse. The *teeth* were somewhat chalky, but not greatly altered. There was an extreme deformity of the *thorax*, resembling that noted in rat Y_3. There was also marked kyphosis and lateral curvature. There were many whitish nodules along the shafts of the *ribs*, especially in the paravertebral lines. The ribs were very soft, and on cross-section the marrow cavity seemed almost obliterated owing to the great thickening of the cortex of the bone. At the chondrocostal junctions were nodular projections several millimeters in thickness. The *femora* were short, and very broad in the region of the epiphyses. The upper third of the *tibiæ* was bowed anteriorly.

Microscopic examination: The superficial layer of dentin of the upper *incisors* is well calcified; in the middle zone, the calcium is in the form of globular masses of large size, and the inner zone, comprising about one-third of the total thickness of the dentin, is calcium-free. Toward the apex the calcification is more complete. The lower incisors exhibit more striking changes, especially on the concave surface, where about half the dentin is free from calcium. The vessels of the pulp are extremely congested, and the odontoblast layer is broken up in many places by fresh capillary hemorrhages. Toward the apex of the tooth, the layer of odontoblasts becomes entirely disorganized, with the formation of numerous ragged cavities, possibly the effect of gas formed during decalcification. The enamel epithelium is intact save in one place, where the cells are destroyed by hemorrhage.

The zone of proliferating cartilage of the *ribs* is composed of irregular masses of cells which fail to show the normal alinement into columns, and which extend a variable distance into the adjacent trabeculæ. The neighboring part of the rib is composed of a knob of anastomosing columns separated by very narrow Haversian spaces. The distinction between osteoid and calcified bone is not sharply

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brought out in the sections, but the rounded form of the bone corpuscles and their highly irregular distribution suggest deficient calcification. The osteoblasts form a continuous flat row covering the trabeculæ. There is no increased lacunar resorption. Beyond this knob of tissue the bone is sharply bent upon itself. A tongue of cartilage grows into this angle from the external surface of the periosteum. The cortex of the rib is greatly thickened and formed of parallel trabeculæ which encroach upon the medullary cavity, which is correspondingly narrowed. The marrow is normal, save in the region of the junction, where it is fibrous.

In order to determine the possible infectious character of this disease, four half-grown and apparently healthy rats were inoculated with a suspension of bone marrow from rat Y_s.

One of the inoculated rats (55), killed twenty-eight days after subcutaneous injection, showed striking alterations in the bones and teeth. There was in this rat no gross deformity of the *thorax*, but an evident widening of the translucent zone of proliferating cartilage, and the adjacent bony part of the *ribs* was opaque and slightly thickened. The *femora* were broad and thick, and so soft that they could easily be cut with scissors. The *tibiæ* were bowed anteriorly.

Changes in the *teeth* were first noted four days before the animal was killed. The basal portions of the upper incisors were found to be distinctly swollen, translucent, grayish, and rounded, sharply marked off from the distal third, which was opaque and chalky white. During the next few days, the swelling and translucency extended almost to the tip of the tooth. The lower incisors were also less opaque than normally.

Microscopic examination: No changes were found in any of the internal viscera. The *marked defect and irregularity of the dentin* is shown in Figs. 4a, 4b, 4c, and 4d, Plate 2. It is seen that on the convex surface of the upper incisors the irregularity in arrangement of the odontoblasts is such that these have apparently given rise to predentin both on their external and internal surfaces. They are thus disposed in a row on both sides of which is uncalcified dentin, and are connected by numerous cell strands with the pulp. The concave side of the tooth is calcium-free throughout its entire extent, and is pierced in many places by isolated spindle cells and occasionally by capillaries. The changes in the *ribs* and *femora* consisted merely of an increase in the width of the osteoid margins. No definite alterations were found in the cartilages.

Data pertaining to the content of Calcium in the Bones and Teeth, for various Groups of the Rats referred to in Table 2.

Groups of rats.	Percentage of calcium.	
	Bones.	Teeth.
1. Non-rhachitic and slightly rhachitic	23.03	27.99
2. Moderately rhachitic and markedly rhachitic	20.21	27.08
3. Completely thymectomized (excluding W_2)[17]	21.34	28.40
4. Control and incompletely thymectomized[17]	22.00	27.83
5. Rhachitic (stock)	20.74	25.96

[17] Rat W_2 (Table 2) evidently belongs to group 4 in this table. If the figures for the calcium content pertaining to rat W_2 are added to those of group 4 in this table, the average values for calcium become 22.22 and 27.87 per cent., respectively.

The foregoing protocols show that lesions of the bones and teeth were observed in thymectomized rats, in controls of the same litters, in stock animals, and in a rat inoculated with bone marrow from a thymectomized rat with lesions of the skeletal system.

There is little question that these lesions resemble closely those described by Morpurgo, in 1900, as infective osteomalacia of white rats. In his

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subsequent investigations, Morpurgo showed that in young animals, the spontaneous disease takes the form of rhachitis.

Teeth and bones from eighteen of the rats involved in Dr. Pappenheimer's experiments were subjected by us to chemical analysis. The teeth and bones were prepared for this purpose by the method described in section II (page 111). Calcium was determined as before, *i.e.* by McCrudden's method. Magnesium was determined, in the liquid obtained as indicated in section II, by McCrudden's method.[15] Phosphorus was determined in portions of such liquid by the "official agricultural method."[16]

The accompanying plates (referred to first on page 117, and later in the foregoing protocols) illustrate certain of the statements in the above descriptions. Table 2 presents a summary of data from Dr. Pappenheimer's record and gives our analytic results for calcium, magnesium, and phosphorus.

Dr. Pappenheimer's general conclusions from the *histological* data were stated as follows:

Rhachitic changes in the bones and teeth occur in young albino rats as the result of spontaneous disease, possibly of infective origin. This disease is often, but not always, accompanied by an arrest of growth and malnutrition.

There is no valid reason for attributing such lesions to the loss of thymic function. In some rats showing the disease, an unusual number of mitoses were found in the parathyroid glands, but no evidence of injury to these structures.

It has not been found possible to confirm the statements of Klose and Magnini as to the fatal effects of complete thymus extirpation in rats.

A general summary of our calcium data, as given in Table 2, is presented on the opposite page.

The values in this summary, and the chemical results in Table 2, make it evident, as we stated in our recent paper accompanying Dr. Pappenheimer's, that the foregoing *chemical* data agree, in the main, with the corresponding histological findings reported in Dr. Pappenheimer's paper. Our results indicate that the bones and teeth of the rats which were found by Dr. Pappenheimer to be moderately rhachitic and markedly rhachitic, contained in general less calcium than those from the non-rhachitic and slightly rhachitic animals. The lack of any particular trend of calcium content in the bones and teeth from the thymectomized rats, as shown by both the individual results in Table 2 and the group averages in the above summary, makes it impossible to ascribe to thymectomy, in these animals, any special influence upon the processes of calcification in the bones and teeth subjected to analysis. The validity of this negative conclusion is emphasized by the low values for calcium content in the bones and teeth from the unoperated rhachitic (stock) animals. That such spontaneously rhachitic rats happened to be among the number selected for Dr. Pappenheimer's experiments, and that rhachitic lesions observed in the thymectomized animals were due to causes independent of thymectomy, are necessary inferences under the circumstances. It is possible, of course, that determina-

[15] McCrudden: *Journal of Biological Chemistry*, 1909, vii, p. 83.

[16] Bulletin 107, U. S. Department of Agriculture (1912); "Official methods of analysis, Association of Official Agricultural Chemists," p. 2.

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Directly comparative percentage data on degree of "calcification" (from Table 2).

Groups of rats.	Calcium.		Magnesium.		Phosphorus.	
	Teeth.	Bones.	Teeth.	Bones.	Teeth.	Bones.
1. Non-rhachitic:						
*U_1	27.48	22.61	1.51	0.60	15.28	10.90
U_6	28.29	22.74	1.91	0.52	15.80	12.45
W_4	28.99	23.75	1.54	0.53	17.12	. . .
Average	*28.25*	*23.03*	*1.65*	*0.55*	*16.07*	*11.67*
2. Moderately rhachitic:						
*Y_2	28.53	. . .	3.48	. . .	19.78	. .
55	. . .	20.66	. . .	1.34	. . .	9.30
Average (?)	*28.53*	*20.66*	*3.48*	*1.34*	*19.78*	*9.30*
3. Markedly rhachitic:						
X_5	. . .	18.92	. . .	1.35	. . .	11.87
*Y_3	. . .	17.85	. . .	0.92	. . .	9.63
50	. . .	23.41	. .	2.62	. . .	13.88
53	. . .	. . .	2.79	. . .	. . .	. . .
Average	. . .	*20.06*	*2.79*	*1.60*	. . .	*11.79*

*The asterisks indicate thymectomized rats. The remainder were "control" or stock animals.

tions of phosphate content might have afforded indications of a special influence of thymectomy.[18]

It is assumed by Dr. Pappenheimer and by us that the mixed food of the rats, which was given in abundance and eaten freely, was ample in quantity, in quality, and in metabolic availability for the maintenance of the processes of normal calcification in each animal. One cannot be certain of such an outcome in experiments of this kind, however, unless the animals are individually maintained under suitably controlled metabolic conditions on diets of definite composition, of known quantity, and of proved nutritional adequacy. We require also, for correct interpretations of analytic data on calcification, more exact chemical knowledge of the variations in the composition of the bones and teeth of normal albino rats of different ages under given metabolic conditions. It is our intention to investigate in this laboratory, as a part of a plan of research in progress, the facts in these particular connections, with special reference to the possible establishment of definite physiological standards on which further experimental work with albino rats may be conducted more accurately.

As was stated above, our data for magnesium and phosphorus were obtained after the publication of the paper by Morgulis and Gies that accompanied Dr. Pappenheimer's. Our summary of such data from Table 2 (see above) facilitates direct comparison with the above summary of the results for calcium, and also with the corresponding individual results for calcium.

[18] This suggestion was published before our data for magnesium and phosphorus were available. (See above.)

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The data in this summary appear to justify the conclusion that the proportions of magnesium in the teeth and bones of the rhachitic rats were higher than those of the non-rhachitic animals. The data in this summary are indefinite so far as influence on phosphatation is concerned. As our work progresses additional results in this connection will be accumulated.

In the discussion of his thymectomy data Dr. Pappenheimer referred instructively, as follows, to results pertaining to parathyroidectomy, in accord with our own views in this relation:

Defective calcification of the dentin, and penetration of the uncalcified tissue by blood-vessels and isolated cells from the odontoblast layer, regarded by Erdheim and his successors as characteristic of parathyroid deprivation, were observed also in many of the rats in the thymectomy experiments described above. In one rat there occurred a spontaneous fracture of the tooth. Less marked in my rats was the infolding and disarrangement of the ameloblast layer; but this appears to be of secondary importance also in the lesions attributed to parathyroidectomy, and when present is probably due to mechanical causes.

The question arises, therefore, whether Erdheim, who was familiar with the spontaneous rhachitic lesions of rats, was justified in attributing these changes to parathyroid insufficiency. Erdheim has brought forward his transplantation experiments as crucial proof of the part of the parathyroids in normal calcification. The "Transplantations-streife" is believed to correspond exactly in its localization with the period of functional activity of the implanted parathyroid tissue.

This would be entirely convincing were it not for the fact that such alternating layers of calcium-containing and calcium-free dentin not infrequently occur as spontaneous rhachitic lesions. They are associated, no doubt, with remissions and exacerbations of the disease, such as have been described by Morpurgo. Fig. 3 illustrates the striate deposition of the calcium in the incisor of a spontaneously rhachitic rat.

Without wishing to discredit the work of Erdheim, supported as it is by other facts indicating an influence of the parathyroids upon calcium metabolism, one cannot but emphasize the identity of these lesions, attributed to the loss of parathyroid function, with those occurring in the spontaneous rickets of rats.

As regards the infectivity of the disease and the nature of the inciting organism, studies made in coöperation with Dr. J. G. Hopkins have not as yet led to conclusive results. The occurrence of rhachitic lesions in a rat, examined twenty-eight days after inoculation of bone marrow from a spontaneously rhachitic animal, is of doubtful significance, since many of the stock animals killed at this time were found to be rhachitic. The recent experiments of Koch, in which typical rhachitic lesions were produced in puppies by the intravenous injection of streptococci, indicate that the infective factor has to be reckoned with in experiments dealing with the effect of extirpation of ductless glands upon bone development in dogs as well as rats.

Sufficient evidence, we believe, has been brought forward to show that the bone changes described by Klose are in no way related to the loss of the thymus gland, but occur as the result of spontaneous disease.

The importance of giving due consideration, in experiments of this kind, to the possibilities of "spontaneous rickets," along with many other "variables," can hardly be overestimated.

IV. General Conclusions.

Our data for thyro-parathyroidectomy, while suggesting support of Erdheim's conclusions regarding the decalcifying effects of parathyroidectomy, are inconclusive. The experiments will be continued.

The experiments on thymectomy failed to show that calcification processes were in any way affected by removal of the thymus.

Rhachitic changes in the bones and teeth occur in young albino rats as the result of *spontaneous* disease, possibly of infective origin. This disease is often, but not always, accompanied by an arrest of growth and malnutrition (Pappenheimer).

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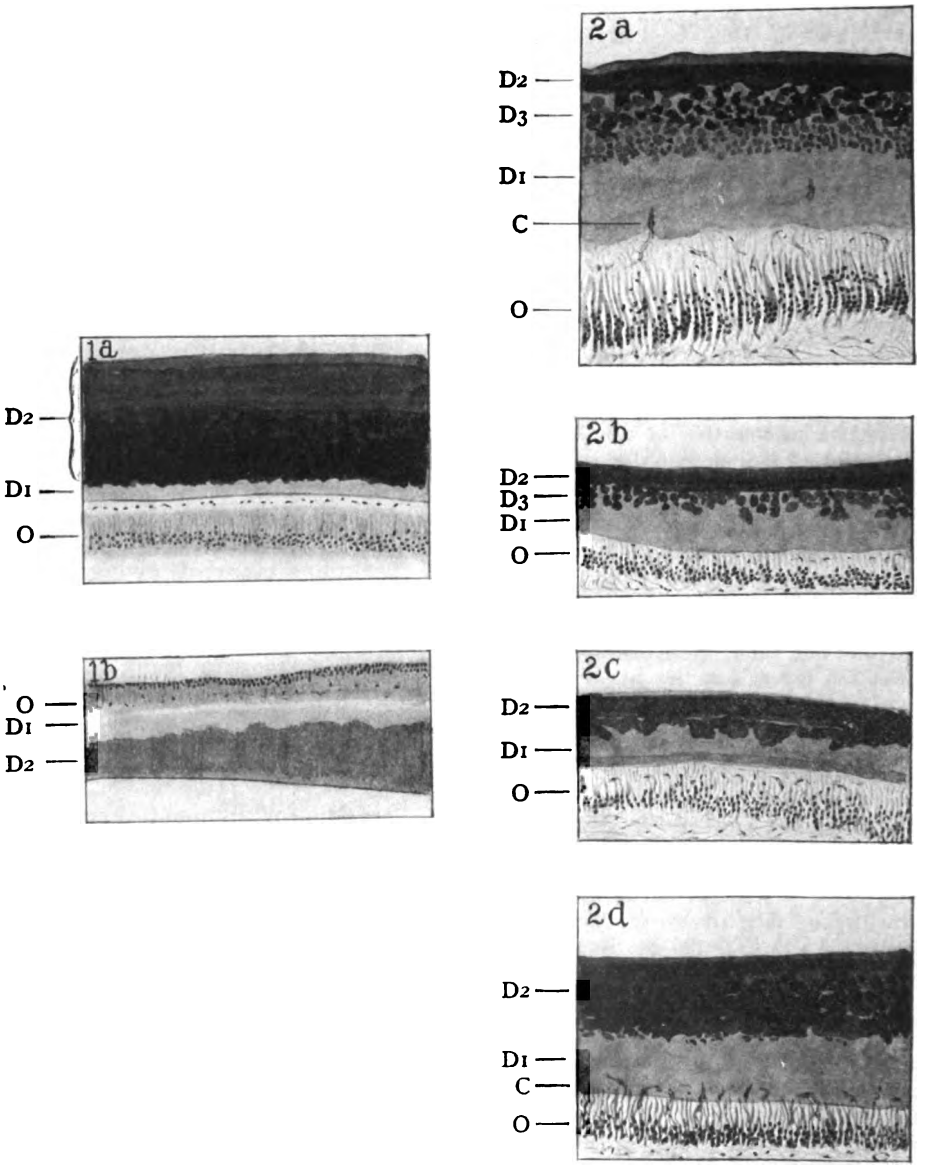
PLATE 1.



Pappenheimer: "Effects of Extirpation of Thymus in Rats."

(Plates reprinted, by permission, from the *Journal of Experimental Medicine*, vol. xx.)

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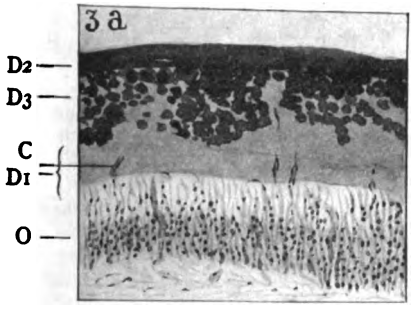
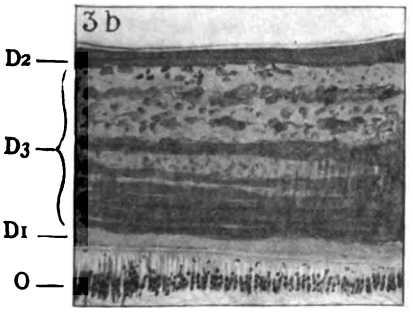
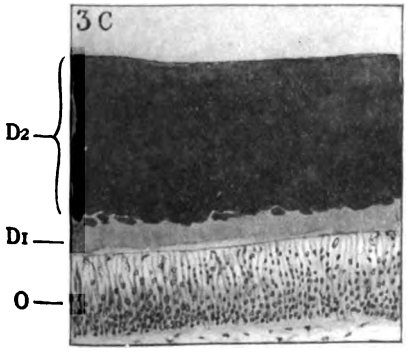
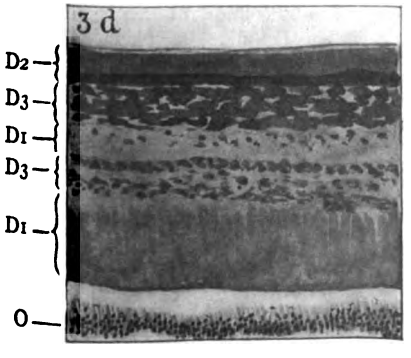
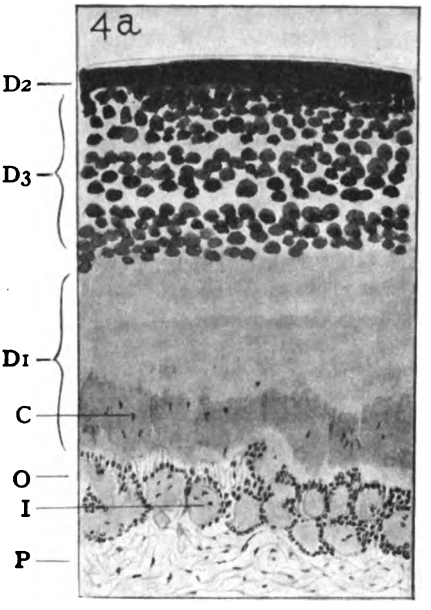
PLATE 2.

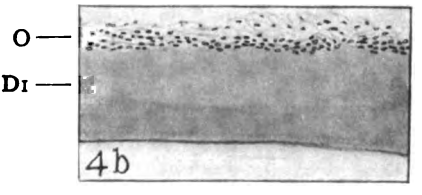


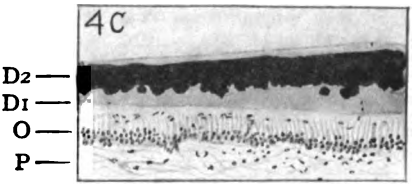


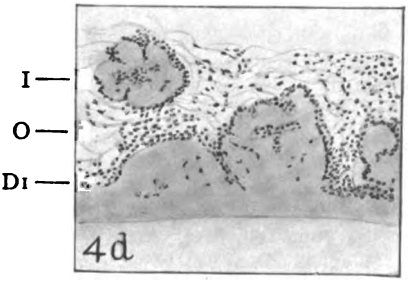












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Our experience has shown that many variables in studies of this kind must be more effectively controlled than previous workers (or we ourselves) have done, to insure reliable foundations for sound deductions regarding specific effects from particular causes.

These studies are in progress.

In the conduct of the calcium determinations we have had the co-operation of Dr. Alfred P. Lothrop, to whom we are greatly indebted for this assistance.

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VI. Explanation of Plates.

Plate 1.

Fig. 1a. Rat O_1. Thymectomy. Killed after 120 days. Upper incisor, convex side. D_1 = calcium-free dentin. D_2 = calcified dentin. O = odontoblasts.

Fig. 1b. Same tooth, concave side. Normal relations between calcified and uncalcified dentin.

Fig. 2a. Rat X_2. Thymectomy; accessory thymus. Killed after 151 days. Upper incisor, convex side, about middle of tooth. Defective calcification of dentin, ingrowth of bloodvessels from odontoblast layer. D_2 = incompletely calcified dentin. C = capillary.

Fig. 2b. Concave side of same tooth. Same designations.

Fig. 2c. Lower incisor, concave side.

Fig. 2d. Lower incisor, convex side.

Plate 2.

Fig. 3a. Rat X_3, control. Killed same time as X_2. Upper incisor, convex side.

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FIG. 3b. Upper incisor, concave side. Deposition of calcium in layers.

FIG. 3c. Lower incisor, convex side.

FIG. 3d. Lower incisor, concave side. Alternating striæ of calcium-containing and calcium-free dentin.

FIG. 4a. Rat 55. Injected subcutaneously with suspension of bone marrow of the rhachitic rat Y_8. Killed after 28 days. Upper incisor. Incomplete calcification of dentin. Irregular disposition of odontoblasts. I = islands of uncalcified dentin. P = pulp.

FIG. 4b. Upper incisor, concave side. Dentin wholly calcium-free. Odontoblast layer indistinct.

FIG. 4c. Lower incisor, convex side.

FIG. 4d. Lower incisor, concave side. Dentin entirely uncalcified and convoluted. Ingrowth of odontoblasts and capillaries.

DISCUSSION.

Dr. JOHN ROGERS, New York. It is becoming quite evident that the dentist's responsibility to his patients is steadily increasing. The onset of many chronic disorders is quite frequently first manifested by disease of the teeth, and the dentist must now have some conception of the early symptoms of what may later prove some very troublesome or incurable disease.

Dr. Gies has summarized much of the physiology of the ductless glands, hence I shall confine myself chiefly to the thyroid, which, from its anatomical position and its susceptibility to enlargement as well as its seemingly important relationship to the teeth, should be familiar to every dentist.

Any enlargement of this gland which renders it perceptible to sight or touch represents an abnormality. The best evidence which we have suggests if it does not prove that this increase in size is at bottom not a disease but an attempt of nature to compensate for greater demands on the part of the body for the thyroid secretion than the gland of natural size can supply. It seems probable that some individuals have thyroids which are more capable of functionating than those of others, and when larger amounts of thyroid activity are required than the organ of normal outline can supply, nature has provided that the gland can undergo a compensatory hypertrophy. It is very common to note that, just before or during the period in which these changes become apparent in the neck, the patient has been subjected to more than the usual amount of stress, or, more exactly expressed, to more than the usual amount of fatigue.

The early symptoms of these thyroid disturbances are all those of ordinary fatigue, and throughout all stages of the process there are sensations of nervous and physical weakness, and at the beginning there are generally evidences of more or less deficient functionation in nearly all the organs of the body. At this period, as well as later, it is very common to observe caries of the teeth, and the cause should not be sought locally, but in the constitutional disturbance. An enlarged thyroid is extremely easy to detect, and in its presence suspicion should immediately be aroused.

From a simple compensatory hypertrophy with mild disturbances of nu-

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trition, thyroid disorders may advance in any one of three directions; either into the common goiter, which ordinarily means a permanent degenerative change in the organ, with or without other symptoms; or into myxedema; or into the stage of hyperthyroidism and later exophthalmic goiter. If the first compensatory hypertrophy is recognized, and its significance understood, much trouble can generally be prevented, and the dentist has peculiar opportunities in this service.

The pathological physiology involved in these thyroid abnormalities is for the most part unknown, but some recent experiments help to explain part of the symptoms. The thyroid, through the secretion by which alone its function is performed, seems to be intimately concerned with the chemical processes underlying the production and expenditure of energy, hence its apparent relationship with the phenomena of fatigue. Dr. Gies has referred to the experiments of Gudernatsch, who, by feeding thyroid tissue to tadpoles, has caused the animals to metamorphose into complete frogs within a few days; the normal metamorphosis requiring from six to eight weeks. If the tadpoles, on the other hand, are fed only upon thymus gland, they remain always tadpoles. They grow to giant size, but show no attempt to metamorphosis. But if, at any time during this period, the thymus-fed tadpoles are put upon a thyroid diet, their metamorphosis occurs almost at once. They can be changed from tadpoles of any desired size into fully formed frogs. Reversing the way in which they are fed, however, does not make the frog reverse its development; —once a frog, always a frog.

These experiments prove the immense importance of the thyroid in growth and development, particularly in the changes which take place in the metamorphoses of childhood into youth and adolesence, and they help to explain the hypertrophy of the thyroid which is so commonly observed in young people. It appears to be an enlargement of a presumably weak organ to compensate for demands for secretion to promote the nutritional processes incident to growth. During this time caries of the teeth is both common and troublesome, and if associated with goiter or thyroid enlargement the caries may be remediable by appropriate constitutional treatment. The therapeutics which seem indicated in the early stages, by the way, are of a protective and supporting nature, rather than destructive, or surgical removal of the gland.

If the thyroid is enlarged and there are no constitutional symptoms other than fatigue and dental caries, it is perfectly logical to help out the supposedly overworked gland by advising rest and freedom from nervous strain, and at the same time to prescribe thyroid feeding. As ordinarily practiced, this is by no means free from danger. The explanation of these risks involves a discussion of the metabolism of iodin by the thyroid, and is long and involved. It is enough to say that the presumable fatigue of the thyroid, which accompanies its forced activity in supporting an excessive production and expenditure of energy, means a fatigue of its epithelium, which interferes with the production of the thyroid secretion. Iodin seems to be an essential constituent of this secretion, and if the epithelium from which it comes cannot metamorphose iodin, any blood excess of this element produced by feeding it in the

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form of tablets of thyroid substance (which always contains iodin), or in the form of potassium iodid, must damage the thyroid epithelium. It seems too "tired" to perform its biochemical duties. Clinically, it very often does harm instead of the good one would theoretically expect. In our experiments at the Cornell Medical College we have attempted to overcome these difficulties by employing what seems to be the active principle of the thyroid. We have used the proteins which can be recovered from an aqueous extract of the thyroid, and standarized them according to their iodin content, and we have also used a liquid which seems to be still nearer to the active principle. Neither of these substances, however, is perfect, but both are much better and safer than the desiccated gland substance.

The investigations in which I have been interested, while as yet inconclusive, strongly suggest that the physiology of the thyroid and other ductless glands involves the relationship of the nerve terminals to each cell and its nearest blood supply. It seems possible that each ductless gland, through its secretion, controls the metabolism in each cell of some inorganic element, and that the secretions overlap, so to speak, in this influence. The thyroid, for example, may control the metabolism of calcium and potassium, while the thymus may control that of calcium and sodium, or of potassium and magnesium, and when either gland fails in its duty the tissues in which these elements are most important show a corresponding failure.

All the evidence we possess seems to indicate that the effects of the thyroid, or more exactly, of its secretion, are exerted upon the terminal filaments of some portions of the sympathetic nervous system; that it has a profound effect upon the nutrition of practically every organ in the body, and—which is not least in importance—upon the nutrition of the teeth.

Dr. Francis H. McCrudden, Boston, Mass. When I began to study bone diseases nearly fifteen years ago, I was greatly hampered by the prevailing view that bone is dead tissue not undergoing metabolism, and made little progress until I recognized that bone is not dead tissue, but alive, and, like other tissue, undergoing a continuous process of resorption of old and apposition of new. Since this conception proved of fundamental importance in our bone studies, and since teeth are very similar in composition and structure to bone, I should like briefly to present the conception:

In the disease known as osteomalacia the bones become soft and fragile as a result of a decrease in calcium salts—a decrease generally held to be the result of the solvent action of acid. Chemical analysis convinced me that this process cannot be a simple decalcification, for there is not only a relative but also an absolute increase in the amount of osteoid tissue and lime salts, and so I was obliged to conclude that new osteoid tissue and magnesium has been laid down. The results of metabolism experiments and of histological examination, too, are in harmony with this view, for experiments in which intake and outgo were determined showed a loss of calcium and a retention of magnesium and of the elements of osteoid tissue, and histological examination showed an abun-

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dance of osteoblasts and other evidence of young new tissue in the lime-free bone.

These findings made me examine more closely the whole evidence relating to the nature of bone metabolism, with the result that I was forced to conclude that bone does undergo metabolism. The fact that osteomalacia can be produced artificially under certain conditions by the use of a diet poor in calcium is evidence that the skeleton needs a continuous supply of this element. Further evidence of bone metabolism is seen in the fact that the lamellæ, which are so disposed as best to withstand strains, shift their position as, in the course of life, the weight to be borne and the direction of the strain vary. Evidence of anabolism is seen in the formation and calcification of the callus after fractures, and evidence of catabolism in the loss of calcium salts by the bone in starvation and in the thinning of bone during disuse.

In the light of this conception, it becomes easier to understand the nature of the process in osteomalacia. Old bone is continuously resorbed and new bone laid down just as in health, but the new bone is poor in calcium. The reason of the poverty in lime salts was found to be due to a diversion of the calcium to other uses. In the most common form of osteomalacia, namely, puerperal osteomalacia, the salts are diverted to the growing fetus and the milk; in the rarer cases, in nulliparæ and in men, some cause of a flux of calcium such as multiple osteomata, heteroplastic bone formation, severe arterio-sclerosis, and bladder stones of calcium oxalate can nearly always be demonstrated, thus bearing out the conception of the etiology.

A flux of calcium once started does not end as soon as the need ceases for over-production. The factor responsible for the continued production of immune bodies after an infection leads to a continuation of the flux for a variable period afterward, and it is this tendency to over-production which makes puerperal osteomalacia the most common form, for the disease occurs in women after several rapidly succeeding pregnancies and long periods of lactation, the flux of calcium continuing from one period of gestation to the next, and finally becoming continuous.

Rickets and dwarfism are forms of disturbed calcium metabolism. Rickets is a disturbance similar to osteomalacia. Dwarfism of one type is due to an inadequate content of the blood in calcium following great losses through the feces; dwarfism of other types is the result of an inabilty to properly utilize calcium for bone growth.

The normal metabolism of bone is analogous to that of muscle—a continuous process of resorption of old and apposition of new. The skeleton acts as a store of calcium, and loses this element when it is needed elsewhere, so that the store in the bones varies with the needs of the rest of the body, just as the subcutaneous store of fat and the glycogen store of the liver. Mild forms of osteomalacia are often seen in skiagraphs of bones supposed to be normal, and examination of the bone in women dying during pregnancy reveals similar changes in nearly all. But bone has a very high factor of safety, and osteomalacia gives rise to symptoms only after a long-continued drain of calcium, especially in persons in whom the degree of over-production is great.

It is to be noted that osteomalacia and

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allied conditions are not primarily bone diseases, but disturbances of calcium metabolism in which the bone becomes involved—a distinction of importance owing to its possible bearing on dentistry. Any bone or bones, or parts of bones, may be involved. The names rickets, osteomalacia, osteitis deformans, osteoporosis, etc., refer chiefly to localization and distribution of the lesions. In puerperal osteomalacia the pelvic bones are first attacked, the ribs next; in non-puerperal osteomalacia it is more commonly the extremities and ribs; in osteitis deformans, parts of the skull and femur; in severe arterio-sclerosis, parts of the skeleton nearest the most severely sclerosed arteries. In rickets the lesions are found at the junction of the epiphyses and diaphyses and underneath the periosteum; in osteomalacia, in the interior of the bone in proximity to the Haversian canals. As for the teeth, one observer has pointed out that the zone of uncalcified dentin is increased in width in severe cases of rickets, and another observer has noted the same in the spontaneous rickets of rats. As I have already remarked, the incidence of mild forms of osteomalacia is much greater than commonly believed, and this, it seems to me, has a distinct bearing on dentistry. The bones, on the one hand, with their high factor of safety and great protection in the interior of the body, may well be somewhat below par and nevertheless functionate; in the teeth, on the other hand, which are exposed to severe mechanical and chemical violence and have a low normal factor of safety, if judged by the incidence of diseased teeth, any condition like osteomalacia, which still further decreases that factor of safety, must be relatively important.

Calcium metabolism is under the control of certain glands of internal secretion. Removal of the parathyroid leads to mobilization of calcium and to rickets, and the gland has been found affected in osteomalacia. The hypophysis controls directly the metabolism of the epiphysis; hypoplasia of this gland leads to dwarfism; hyperplasia in youth to giantism, later in life to acromegaly. The form of dwarfism known as cretinism is the result of hypoplasia of the thyroid. Status lymphaticus, a condition of generalized hyperplasia of the lymphadenoid tissue, is accompanied by infantile anatomical peculiarities. The relations of the thymus and pancreas to dwarfism, though less definite, are suggestive.

There is more direct evidence of the control of the calcium metabolism of the teeth by the parathyroids in the studies made in Weichselbaum's laboratory in Vienna. After removal of the parathyroids, the dentin of the gnawing teeth of rats was found poor in calcium. In extending these observations, Toyofuku found not only the dentin but also the enamel affected by the operation, and he observed further that the grinding teeth, which do not grow and wear off like gnawing teeth, are also somewhat affected, if the animals are not too old. If the experiments had been continued longer, perhaps the effect on the latter would have been greater. Still later, Erdmann showed very strikingly how removal of the parathyroids is followed by formation of layers of dentin poor in lime salts, to be succeeded by layers of normal dentin when the transplanted parathyroid again began to functionate.

If studies in bone metabolism throw light on the teeth, dentistry may recipro-

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cate. As Stein pointed out last year in the *Dental Cosmos,* examination of the localization of the syphilitic hypoplasia of teeth, together with a knowledge of the time of calcification of the teeth in intra-uterine life, enables one to date the onset of the infection at the fourth month of intra-uterine life. Similar studies on congenital forms of dwarfism associated with deformed teeth, and almost certainly disturbances of internal secretions, might be able to give a lead for the study of these conditions.

Dr. W. A. PRICE, Cleveland, Ohio. The spirit of this hour is one of the most refreshing and encouraging symptoms of dental progress. I want to assure Dr. Gies that the limit of the support of the National Dental Association is the limit of the support of the profession of the State of New York. The National Dental Association, through its Foundation Research Commission, is after the truth. They have no compromise with the man who desires to get royalties to spend on himself, but they are willing to give assistance to him who would rather be shown that he is wrong than that he is right.

In experimenting on animals with a diet which was as nearly calcium-free as we could make it, even to the third decimal, we undertook also to make simultaneous observations of parallel conditions in the human being, studying them from the clinical standpoint. Infants cannot obtain lime salts from the same sources as most animals; for example, rabbits and guinea-pigs can obtain it from lettuce the first day after birth, calves from grass from six weeks to a few months after birth, adult rabbits even from calcium carbonate. Investigations indicate that the human infant can obtain calcium salts only from animal protein for several months after birth, and later from vegetable protein and soluble carbohydrates, and probably much later from insoluble carbohydrates. In our studies of human beings in whose diet we have lowered the calcium content for a time, we selected cases of hypoplasia, and in almost every case in which an accurate history could be secured, the diet had not been normal during the first one or two years of life. The observer was struck immediately by the characteristic markings of the first third of the lower incisors, and the first fourth of the upper incisors in regard to the shape of the teeth and the external structure of both the enamel and dentin. We also found that these markings correspond in different teeth very closely with the developmental periods of these structures. We also came to the conclusion that the markings corresponding with those of Hutchinson's teeth have probably been over-emphasized. In fact, I question whether that symptom is of much value as a diagnostic means in hereditary syphilis, because in many, if not all cases, there is a hypoplasia similar to that observed in patients with a definite history without any syphilitic complication. These hypoplasias nearly always affect not only the enamel but also the dentin. To cite an example: A child, who had been normal for the first few years of life, exhibited an almost normal formation of the enamel of the incisors. Beginning at about three years of age and continuing to about the sixth or seventh year, the child had an increasing complication which finally proved to be a constriction of the cardiac opening into the stomach. There was a continual regurgitation of food, and the child was slowly starving to death dur-

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ing the period when the dentin of the root should have been formed. The treatment of the child was unsuccessful for a period of time, and the condition was finally diagnosed by injecting bismuth subnitrate into the esophagus and stomach. It was found that the food did not enter the stomach but lodged in the esophagus. The condition was rapidly growing worse until an operation was performed, and in a few months the boy was able to swallow and retain food.

The general deductions from these hyperplasias are these: We have found that they are constantly related to imperfect nutrition during the period of the first three years of life, and in almost every case a history of artificial feeding was secured. We found that infants fed on baby foods poor in calcium content or normal proteins and solid carbohydrates, and rich in insoluble carbohydrates, exhibited the characteristic condition of hypoplasia. In fact, this was so marked that we could almost pick out the food that the child was fed upon; this is in accord with the researches made by the Swiss government, which found that those soldiers who had been normally breast-fed could march longer and tolerate greater hardships. In the same manner we found, by compiling cases of all ages for a period of ten years, in people under thirty years of age, about 1 hypoplasia in 75; in people between thirty and sixty years, about 1 in 100, and in people over sixty years, about 1 in 500. We also found that, in several cases, the typical marking was present. In one case particularly, the mother acknowledged that she had deprived the child of breast-feeding so that she might not be bothered with nursing him.

Another point that I wish to speak of is the relationship of the ductless glands, and particularly the hypophysis, to the development of the dental tissues and the dental arch. The case which I shall present is a very unusual one. A boy fifteen and a half years of age presented all the typical symptoms of disordered functional activity of the pituitary body. He had been normal until four years of age, when he became affected with cerebro-spinal meningitis; as a result the development of his maxillary bones was almost the same as that of a child four or five years of age, and the development of the teeth has been abnormal since that time. The fact that the upper arch occluded inside of the lower arch may be a factor which increased the pressure on the pituitary. Regardless of whether it did or not, here is a remarkable feature of this case: When we widened the space between the maxillary bones, and brought the maxillary bones downward and forward to a distance of one-half or three-quarters of an inch, as shown by the skiagraph, immediately the boy's whole physical, mental, and moral condition changed. I wish now to refer for a moment to the separation of the maxillary bones. The left nostril was entirely occluded. A rhinologist had spent half an hour trying to pass moisture through it by the aid of adrenalin. Inside of thirty days, he could pass a lead pencil into the nostril, and the patient was able to hold the mouth closed and breathe through the nostril which originally had been entirely closed.

The boy showed all the characteristic symptoms of a disordered pituitary condition. He was infantile in development at fifteen and a half years of age, about like a child of six or seven years of age, and his reproductive organs were en-

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tirely infantile. He kept asking for something to drink, and seemed to be sleepy all the time. The conditions in this case correspond exactly with the findings of Dr. Cushing, who removed the pituitary body in dogs and found that they remained infantile, especially with regard to the reproductive organs. In other words, a puppy from which the pituitary body was removed did not have the reproductive organs develop. The dog became slow in his actions, in the same manner as was observed in the case of this child. When we began treatment the child immediately began to develop mentally to such an extent that he wanted to play with boys near his own age, whereas previously he had played with toys in the same way as a child of five or six years of age. In twelve weeks that boy's reproductive organs went through almost the complete cycle which marks the development from childhood to adolescence. Instead of having for playmates children of five or six years of age, he wanted my lady assistant to go to a dance with him. He lives in another town, and while, before treatment, he had to be taken back and forth, he is now able to go to the train and travel that distance alone. A pathetic feature in this case is that the development of his reproductive organs has been such that the boy has become almost a "bear." His mother and sisters say that he must be sent to a school where there are no women.

The significance of all this is very great. Here is the case of a boy with arrested maxillary development, an interlocked condition of the maxillary bones, and there seems to be no doubt that this condition had much to do with pressure on the pituitary body, because there was an immediate improvement upon widening of the maxillary arch. Is not that also an answer to the question of why children seem to become brighter after orthodontia treatment? When we go deeper into this subject, the question arises as to the relationship of the deposition of the calcium forming the maxillary bones to the obstruction of the pituitary body. Was there, in the case described, any constriction around the infundibulum by the process of skull-tissue formation after the attack of cerebro-spinal meningitis? Whether there was a lack of proper secretion that reduced the organ in size, or whether there was an interference of the intricate functioning of the glands of internal secretion of the pituitary body acting as the center of control of the thyroid and parathyroid glands, we cannot say.

Thus the whole problem brings us back to the question of research. So far as the National Association is concerned, the aim of the commission for this work is to encourage just such work as Dr. Gies has been doing, and at the same time to gather all the data possible and make them available for others doing that work. In other words, in the last analysis the ambition of the commission is to bring about the greatest good to the greatest possible number.

Dr. G. V. I. Brown, Milwaukee, Wis. I have come a long way to hear this report, and will have to go home again in a few minutes, but I would have traveled many times as far to hear the report we have just listened to. It has given me pleasure beyond description, and it will be of inestimable benefit to the community, unless I am much mistaken—because I feel sure that this is but the beginning of the work, and that we will go on until definite results are reached.

Personally I have become tired of rea-

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soning by analogy, of working on an empirical basis—and I think we all have. Unfortunately, once the idea of this ductless gland system gets hold of one, it is almost impossible to get rid of it; it is so insidious that it shakes one's very foundations for reasoning, and one is completely at sea; this, after fifteen years of very active work in one direction, is my own personal position. The real value of this report, as I understand it, lies in its all-embracing character. It reaches every point, every center, every interest with which we have to deal, and it wipes out once and for all every line of distinction between the various branches of the medical profession. There can be no longer any such distinction once the purport of these secretions is understood, even in so far as we now comprehend them.

Whichever one of these particular glands is involved, we note, in a certain measure at least, certain physical indications which are similar to those due to the other glands, and the investigation of the relationship of these glands to each other is now our most difficult problem. There is no question that in this functional balance there is a correlation of these glands which is essential to the perfect working of the whole, and some writers have claimed that there are certain definite characteristics not only of each of the glands themselves, but of different parts of these glands, as for example in the posterior and anterior lobes of the pituitary. We know from experiment that by the use of extracts and removal of portions of these glands, certain more or less definite results are obtained. We note some of these effects following castration. We note, in some cases, hyperthyroidism, or other diseases and affections of other ductless glands, and it is for that reason above all others that there is greater necessity for beginning on a solid foundation such as has been laid for us today with great patience.

I admire Dr. Gies' patience in making this clear to us almost as much as I admire his scientific knowledge. With great patience and profound understanding he has laid a foundation upon which we can build a structure which, if we do not allow ourselves to be carried away with over-enthusiasm in regard to any results we have obtained, will some day be the controlling structure in the science of medicine.

I want to speak for just a moment of the clinical demand for this knowledge. Only the other day, in one of our large cities, I was taken into a hospital and found a young girl lying with a twenty-five-pound weight on her feet, being treated for extension of the hip. There was a shortening of two inches, and an endeavor was being made to effect an extension by mechanical means; the physician said that, curiously, there was no lesion in the hip which the X-ray would show, and that there had not been any destruction or any suppuration. I asked him if he had ever looked at the back, and he said, "No." I had the girl sit up, and she exhibited the shoulderblade characteristic for all these cases, also the peculiar development of the feet and ankles, and, of course, a narrow contracted arch, with narrow nares and mouth-breathing. There was a complete picture, quite similar to some of the cases shown by me last year, of unequal development of the halves of the body. In this case, first of all, a knowledge was needed of the underlying factors responsible for the ill-development. This child's parents were lavishing every

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effort to bring her back to nervous stability; her case was not so bad as that of cretinism described, but the clinical picture is somewhat similar. I have among my patients a child who is developing apparently normally, but whose speech center is not active; she does not try to talk. There is no doubt about such nervous instability in this case; the child is looked upon as being defective. Now, with the present light on these matters and the scientific stimulus in this field, there is hope that in the future we shall far exceed our present curative resources.

In one of the cases we showed last year, one of dementia precox, it seemed difficult to say whether that case could be treated, but today the man is well. He has been restored to his family, has had a child born, and is apparently well. The picture of these cases is the picture of other less serious cases. Then there is that other type of extreme nervousness and excitability, the wasting of muscular and other tissue, and no doubt bone as well. In our experiments on dogs, we produced the same general symptoms, and we had difficulty in keeping them alive longer than six months, because of their susceptibility to infection. In these dogs, showing evidences of disordered pituitary glands, we expected to find microscopic changes in the pituitaries which we would be able to recognize, but, when we went to examine them, we found that we did not know what the normal pituitary was. We had no standard to go by. All this presents to us a large and unsettled problem which will have to be worked out by experimentation, and I hope that I may live to see the final result of what today's transactions are the beginning; if I do, I shall have lived to see the end of most ills to which mankind is heir.

Dr. L. M. Waugh, New York. I do not believe that, in my professional career, I have more enjoyed two hours than those just past. It seems that all the disappointment which one sometimes experiences when reflecting that he has gotten into an occupation which is dominated merely by the mechanical and not based upon an underlying knowledge of science is removed by just such experiences, which inspire one with the hope of something that is yet going to be sufficient to satisfy the life-work of the man who is ambitious from the broader standpoint.

I shall not attempt to discuss the paper, although I have been attracted by the important problems concerning tooth calcification and bone development in the structures of the jaws and face. I can only sit in admiration and calm satisfaction over the advancement that is promised to us. The fact that eminent scientists in the forefront of research have been willing to come before us dentists and give the best of their knowledge, it would seem, promises something for which I have yearned ever since I have been engaged in dental practice. The beneficent possibilities of our work seem as far-reaching as those of any other branch of the healing art. In taking up a single part of our work as a specialty, I have been guided by the feeling that concentration offers the possibility of scientific work by the application of just such bigger thoughts as we have heard today. In orthodontia, it seemed, there were greater possibilities for the application of these principles than in any other branch of dentistry, but today I am awakened to

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their important bearing upon all phases of dentistry.

Dr. Price told us about the wonderful results following the removal of pressure upon the pituitary body which had caused the arrest of growth in that tiny gland, with resulting malocclusion. That particular case furnishes another evidence of the fact that in too many instances we have been blindly treating the symptom and not the cause. Also, in acromegaly and many other perversions, the application of these enlightening researches promises great possibilities for the improvement of oral function. When Dr. Brown said that the application of these scientific principles to mouth conditions would tend to obliterate any line of demarcation that might separate certain branches of the healing art, I believe he stated a truth and augured a most desirable relationship which will result in better professional service.

This is most gratifying to me, as it must be to all who have embraced the privilege of aiding in this research movement. You and I cannot possibly do valuable scientific investigation and at the same time attend to a supporting practice. Therefore I have experienced great comfort in contributing my mite in money toward the employment of those who have, by special training, been prepared for research and who are giving their entire time and best energies to it. As each new discovery shall be established and given to us as a guide for better practice, I shall feel the utmost gratification in the fact that, having supported the work in a material way, I am morally entitled to the newer and better knowledge which this research may give to dentistry and to our patients.

Dr. E. S. Davenport, New York. I wish to say a word of recognition of the value to the profession of this research work—which is, I believe, but just beginning. There are few dentists who are educated sufficiently to take an active part in the accomplishment of work of this character. We are all interested and will be more and more so, I am sure, in the development of this work, but most of us are unable to contribute very largely to its scientific progress. There are men, as we have seen this afternoon, who are able, trained investigators, giving their lives to original research, and to them we must entrust the continuation of this valuable work.

While we are individually anxious and willing to contribute to the extent of our ability to the funds which are so essential, it seems to me we should not depend upon ourselves alone for the necessary money, but should each try to interest one or more patients of wealth in this splendid cause. We all have patients more or less philanthropically inclined who would consider it a privilege to contribute to so important an object, and my desire is to call your attention to that phase of the situation. A number of years ago the late Benjamin Lord, one of New York City's best dentists, so interested his patients that the New York Institute of Stomatology was able to establish a research department under the supervision of Prof. Wm. J. Gies of Columbia University, and that department has been continued and financed by the so-called "Lord fund," largely formed by the contributions of Dr. Lord's patients.

Dr. Gies (closing the discussion). It has been a very great pleasure to listen to this enthusiastic discussion, in which

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the principle underlying our plan of research has been indorsed with unanimity, and in which so many facts of intimate and suggestive relationship have been presented. I came here with some of the emotions of a missionary to the Fiji Islands—with abounding confidence in the saving grace of our gospel, but with nervous fear of seeing my finish in the soup! Instead of an end of our ministry, there are cordial intimations to make the sermons louder, longer, and more learned. I am sure it is confidence in the *potentialities* of our profession of faith—confidence in the promise of a heavenly dental hereafter through continuance in such research—that accounts for the optimism of this earnest discussion and the cordiality of this audience toward each speaker.

We shall proceed with every hope that devoted application to the study of our many problems will afford results of lasting and material benefit. It will be a great stimulus to earnest endeavor to anticipate the enjoyment of future occasions of this happy and instructive character.

Dr. DUNNING. I move that a vote of thanks expressed by a rising vote be extended to Dr. Gies, and to the gentlemen who have taken part in this very interesting discussion.

The motion was carried.

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The Technique and Relative Value of Gold Fillings and Inlays.

By J. V. CONZETT, D.D.S., Dubuque, Iowa.

A DISCUSSION of the subject of the comparative value and technique of the gold filling and the gold inlay is both timely and profitable. The gold inlay has been in the hands of the profession long enough to allow of some definite judgment of its value as a preservative of the dental organs when used as a filling material.

When the cast gold inlay was first given to the profession it was hailed with delight, and a stampede ensued for machines with which to make it. Conservative men of the profession predicted disaster and went as far as saying that the method had no merit of permanent value. Others of equally high standing were loud in their assertions that the ideal method of the restoration of lost tooth tissue with gold had come. Today we again find an alinement of the operators of our profession for and against the gold inlay, and now their arguments are not *à priori* but *à posteriori*, for we are in possession of the results of six years of trial. There have been failures, multitudes of them, and we shall try, within the brief space of time allotted, to draw some conclusions from the failures that we have observed, and see whether they militate against the method itself, or whether they have been the result of a failure properly to grasp the fundamental principles upon which the inlay system rests, or to apply them if understood.

GOLD FOIL FILLINGS.

First let us take a hasty survey of the method of filling cavities with gold foil. Ever since dentistry has been a profession, the ability to fill a tooth properly with gold foil has been the measure of an operator's professional standing, and all dentists have been ambitious to excel along that particular line. Down through the ages of dental development, operator after operator has bequeathed to the profession some improvement in the methods of cavity preparation, the making and the use of the gold foil, the instruments, and the methods for the better and easier use of this king of filling materials. The method as used by the best operators of the present time is not the work of any one man or set of men; it is the result of the evolution of the art as it has been developed in the brains and by the hands of earnest,

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devoted men in all parts of the dental world; but it remained for one man of great genius and indefatigable energy to collect, harmonize, eliminate, and add to the methods of the best men of all time and then give to the world of operative dentistry that which his admirers have been pleased to call the "Black system." Dr. Black does not claim originality in the methods he teaches, and all that we will claim today is that he developed a system with which we may work to better advantage.

Those of us who ardently admire and love him, as I confess to do, are not content to give him so small a part, but for the sake of the advancement of the profession, and for harmony, we are willing to lay aside our personal opinions and work in harmony with anybody who is willing to take the good, come from where it may, and eliminate the bad, come from where it may.

THE BLACK SYSTEM OF CAVITY PREPARATION.

The Black system of cavity preparation teaches certain definite measures of procedure, each step having a logical reason for its existence. After a study of the case under consideration, and when ready to begin our cavity preparation, we follow this plan: First, obtain the outline form. Second, the resistance form. Third, the retention form. Fourth, the convenience form. Fifth, the cavo-surface angle. Sixth, make the toilet of the cavity.

The outline form contemplates the obtaining of extension for prevention and the esthetic form.

EXTENSION FOR PREVENTION.

Extension for prevention means the carrying of all the margins of the cavity into areas of relative immunity to dental caries. It will not be possible for us to make an extended observation of this principle, nor indeed of any of the principles that we predicate, for time will not permit. Suffice it to say that there are areas of immunity and susceptibility upon the surfaces of the teeth, such immune areas being those which are naturally kept clean by the excursions of food over the teeth during mastication, and the movements of the lips, tongue, and cheeks. The susceptible areas are those which lie in places protected from the frictional movements referred to, and thus harbor the organisms which make for decay, for we know that decay cannot take place unless the organisms of decay are able to attach themselves to the teeth, and there remain in undisturbed quietude to prey upon the dental tissues. All pits and fissures must be followed out to their full extent, so that the margins of the inlay or filling may lie in smooth territory, for if this were not done, and a fissure were allowed to remain in part, the remaining part of the fissure would harbor the organisms, and a recurrence of decay would occur about the filling. The buccal and lingual margins must be carried far enough out of the embrasures that the margin of the filling will not be in contact with the approximating tooth. The gingival margin should be carried far enough so that the margin of the finished filling is covered with the gum. In short, all margins must be in territory that is automatically kept clean.

ESTHETIC OUTLINE OF CAVITY.

The esthetic form is that which we give to the outline which will, to the greatest degree, conserve the beauty of the tooth. It is our duty not only to

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save the teeth, but to do so with the least possible interference with esthetic appearance, and in order to do so we must be artists as well as artisans. The filling should be as unobtrusive as is consistent with safety, but I should hesitate to sacrifice safety to beauty, unless it were the express wish of the patient. All external lines should be gently curved, for a curve is always more beautiful than an angle, and lastly, the original form of the tooth must be as perfectly restored as it is possible to do, for there is nothing that detracts from the appearance of a denture more than a lot of misfit teeth, one filled to one form and another to quite a different form and size.

RESISTANCE FORM OF CAVITY.

The resistance form is that which is given to the cavity in order to cause the filling to resist the forces brought to bear thereon. The depth and width of the resistance form must be determined by a study of the conditions obtaining in the case under consideration. Some individuals exert a force of from 250 to 300 pounds upon their teeth during mastication, while others of weaker muscular physique and possibly a sensitive peridental membrane as a result of a pyorrheal tendency, exert a force of but from 50 to 75 pounds. It would obviously be foolish to cut as broadly and as deeply in the latter individual; yet, if we did not cut sufficiently well in the former individual, failure will soon result by reason of the filling being forced out by the stress brought to bear upon it. The resistance form is best obtained by making cavities with flat seats, for a flat foundation distributes the forces that are exerted upon it in the most equable manner. If the foundation were rounded, the filling would have a tendency to rock under the stress of mastication, and this tendency frequently resisted would in time cause a movement in the filling that would make for failure. We insist, therefore, on placing fillings upon bases that are as flat as it is possible to make them.

RETENTIVE FORM.

The retentive form is that which is given a cavity that will resist the pulling forces that have a tendency to lift the filling out of the cavity. Pits, grooves, and deep undercuts were the methods that obtained in the practice and the teaching of too many of the older practitioners, and unfortunately have not been completely banished from the practice of very many operators of the present day. These means of retention are not only unnecessary, but positively harmful, as we might show if time permitted. The only retention necessary for a well-condensed gold filling is parallel walls deep enough to afford sufficient grasp of the gold upon the walls of the tooth. In making a gold foil filling, it is permissible to make a slight undercut, but this should never be deep, and it is scarcely necessary to add, such practice is obviously contra-indicated in the making of a gold inlay. I said that the cavity should be deep enough, and I wish to emphasize that statement, for many of the failures that it has been my privilege to study have been caused by a too shallow cavity preparation. Often the cavity is scarcely cut through the enamel. The cavity must be made deep enough to afford sufficient grasp upon the axial walls to afford a sufficient frictional resistance. Just how much that must be

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cannot be stated, for all cases are not alike, and the preparation of the retentive form must be made with an intelligent perception of the conditions that the finished filling is to meet.

CONVENIENCE FORM.

The convenience form is that which is given to a cavity which enables the operator to adapt his filling material perfectly to the walls of the cavity. Again it is not possible to set down any fixed rules; indeed, the form which it would be easy for one operator to fill might be an absolute impossibility for another. So the only rule that we can make is always to prepare a cavity in such a manner that the operator will be able to fill it perfectly with the material which he has chosen for the case in question. It is much better to sacrifice a portion of a good tooth in order that a perfect filling may be made, and thereby to save the tooth permanently, rather than to leave a doubtful portion and render it impossible to make a perfect restoration and thereby cause a failure with perhaps the loss of the whole tooth, or if not, certainly with the loss of a greater part than would have been lost if the original filling had not been a failure—to say nothing of the inconvenience caused the patient and the chagrin occasioned to the operator.

PREPARATION OF THE CAVO-SURFACE ANGLE: REASONS FOR BEVELING.

The cavo-surface angle should be beveled all around the cavity. I know that some operators advocate the butt joint, but I do not believe that they have any scientific evidence upon which to base their recommendations. The margins should be beveled—

First: To protect the enamel rods. We know that enamel is one of the strongest tissues in the body when its continuity is unbroken, but, by reason of its histological structure, once there is a break in the enamel surface the rods immediately contiguous to the break will be unsupported, and upon the slightest stress will fall into the ditch caused by the absence of the rods concerned in the break. Moreover, any rods that do not reach from the surface of the enamel to the dentinal junction are very weak in their resistance to stress, and fall out very easily; therefore no short rods should be left unprotected upon the surface of the cavity. This can only be prevented by properly beveling the surface of the enamel, or by having such an intimate knowledge of the enamel that all of the enamel preparation will be so made that there will be no short rods left at the surface. We are willing to admit that this can be done, but it is much easier and safer to bevel the margin and thus be sure that all rods are perfectly protected. We should have an intimate knowledge of the histology of the enamel, for we cannot intelligently operate without it.

Second: The beveling of the cavo-surface angle causes a flange to be cast upon the margin of the inlay which can be burnished to perfect contact with the tooth immediately after cementation, thus making an hermetical joint, and minimizing the cement line to the greatest possible degree. If the butt joint is used, it will be impossible to burnish the inlay to adaptation; indeed, it would be unwise to attempt it, for the burnisher would come in contact with the unprotected enamel rods at the margin and cause a checking thereof;—so, if for any reason one persists in the

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use of the butt joint, he must not attempt to burnish the inlay to the tooth.

Third: In the butt joint there is an end-to-end adaptation of gold and tooth, and, be the fit ever so perfect, we know that it is impossible to compress cement to a thinness of less than the one-thousandth of an inch; therefore we will have a thin plate of cement between the inlay and the tooth which has no protection, and the constant pounding of the forces of mastication upon the inlay will be transmitted to the thin plate of cement, which will be disintegrated and eventually fall out and leave a wide-open ditch for all sorts of invasion. The flange upon the inlay, however, can be burnished down to the tooth, the cement line pinched off to the greatest possible degree, and what cement is left will be protected from stress by the flange which seals it in.

TOILET OF THE CAVITY.

The toilet of the cavity comprehends the thorough cleansing of the cavity from all chips, residual decay, or débris of any kind. In the making of a gold filling, the freshly cut dentin, prepared under the protection of the rubber dam, offers the best condition for the adaptation of the gold, and any wash is therefore contra-indicated. If the inlay is to be used, and the cavity has been prepared without the rubber dam, then the cavity should be thoroughly rinsed out with warm water immediately before the cementation of the inlay, and should then be washed with alcohol.

The preparation of a cavity is practically the same for an inlay as for a gold filling, the only possible difference being that in the preparation for a gold filling some undercut retention is permissible, while for an inlay this is, of course, absolutely prohibited.

PERFECT ADAPTATION OF THE FILLING MATERIAL.

No matter how perfectly our cavity has been prepared, if the filling material that is to make the restoration is not perfectly adapted to the tooth, so as to seal it hermetically and protect the dentin from the incursion of moisture and micro-organisms contained therein, the operation will be a failure. The perfect adaptation of gold to the tooth so that it will permanently save the tooth is a fine art. The gold must be so inserted that it will be in perfect adaptation to the walls of the tooth at all points, for a filling is no more perfect than its weakest point. No matter how perfect may be the rest of the filling, if it is imperfect at one point and fails at that place, the whole filling is a failure. In the adaptation of gold to the cavity, a plugger of medium size should be used, one about 1 x ½ millimeter for cavities in proximal surfaces of incisors, and one a little larger for cavities in the proximo-occlusal surfaces of the molars and bicuspids. If too large a plugger is used, too great a degree of force is necessary to condense the gold properly, and if the plugger is too small it will chop the gold and fail to condense it perfectly. In making the filling, the gold should be started in one of the angles, and then each succeeding pellet malleted toward the walls of the cavity. In condensing a pellet of gold the plugger should be started toward the center of the cavity, and in a series of steps the plugger should travel toward the wall of the cavity against which the gold is to be condensed. When the wall of the cavity is

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reached, the plugger should be lifted away from the gold and again seek the center of the cavity and again travel toward the wall, and never should the plugger travel away from the margin toward the center of the cavity, for in so doing we are causing the gold to draw away from the wall, and inasmuch as the malleting has tempered the gold and made it springy, it will be impossible to bring it again into perfect adaptation to the cavity walls. The filling should be thus built up by laminating the gold, or shingling it, to make the whole filling stronger.

DENSITY OF MALLETED AND CAST GOLD FILLINGS.

The life of a gold filling depends a great deal upon its density. We know that cast gold has a specific gravity of 19.2, and the closer we can approximate that density in a filling the better it will be, while a filling with a specific gravity of less than 14 will be a failure in a short time. This is due to two reasons: First, the filling will be too soft to resist the stress of mastication; second, by reason of the very high percentage of air-spaces the filling will be little better than a sponge, for the whole interior of the filling will contain air-spaces which will readily give up the air in exchange for moisture laden with all kinds of impurities. The ingress of the moisture will break up the cohesion of the pellets of gold, and in time it will be possible to pick out the filling with an excavator.

We do not have the problem of density to deal with in making a cast inlay, for the gold is at its highest density when cast, and there are no air-spaces with which to contend; but the problem of softness is very much in evidence. Pure gold has been advocated as the material to be used in the making of all cast gold inlays, for the argument has been advanced that, since in the cast inlay we have the gold at its highest density, we have it in its ideal form for the making of a filling. These advocates forget that gold is softened by heating, and tempered or hardened by malleting or beating. Consequently a gold filling of a specific gravity of 18 will be harder and much more resistant to stress than one of cast gold with a specific gravity of 19.2, because, in the making of a filling, each pellet of gold is beaten again and again so that it attains its maximum hardness, but in the gold inlay the gold has been annealed to its greatest extent, and is consequently at its softest state.

SELECTION OF GOLD FOR CAST INLAYS.

It is true that pure gold gives us a more perfect cast than any other material, but whenever stress is to be exerted upon it, its use is contra-indicated by reason of its softness and its inability to stand up under the strain of mastication.

In cavities in the proximal surfaces of incisors, pure gold is the best material to use, for here no particular stress is brought to bear upon the inlay; but in proximo-occlusal surfaces of molars and bicuspids an alloy should be used. For ordinary cases an alloy of 23-karat gold will be amply sufficient. I personally reach this karat approximately, by using half-and-half pure gold and S. S. W. 22-karat plate gold. This gives an alloy of sufficient resistance, of as good color as the pure gold, and one that casts almost as perfectly.

In cavities demanding a great deal of

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resistance, an alloy of gold and 5 per cent. platinum may advantageously be used.

METHOD OF MAKING WAX MODELS FOR INLAYS.

The problem of adaptation of gold inlays is of the greatest importance, and the success or failure thereof involves a knowledge and an intelligent use of the principles of the manipulation of the wax in model-making and casting of the inlay.

A wax should be used that is hard at mouth temperature, otherwise the wax will have to be hardened by the use of cold water, which will cause a shrinkage of the wax. This shrinkage added to the natural shrinkage of the gold will cause a discrepancy in the finished inlay that will greatly militate against its success. The wax should be brought to the proper temperature, so that it will not be too soft or too hard, by immersing it in water of the right temperature, or in an electric heater made for the purpose, or, if care is exercised, over the open flame. The wax should not be melted, and if too soft it should be allowed to harden before being introduced into the cavity. When ready it should be in the shape of an elongated cone and be introduced into the cavity with a steady pressure. The thumb and first finger of the left hand may be placed on the buccal and lingual surfaces of the tooth and act as a matrix if no matrix be used, and then with the forefinger or thumb of the right hand the wax is thoroughly and firmly pressed into the cavity, this pressure being maintained until the wax is hard. This is done for the purpose of forcing in additional wax as the shrinkage of the wax in cooling makes place for it. When the wax is hard, the patient should not be asked to bite into it, as is the custom with some operators, for the wax is thereby displaced from its adaptation to the walls of the cavity, and a distortion of the inlay will be the result. The wax should rather be carved to occlusion, and the artist will have the opportunity to display his skill to the highest degree in the reproduction of the sulci and occlusal planes.

The investment of the model, its burning-out, and the casting are problems that I dare not attempt to discuss in brevity. Suffice it to say that the model should be immediately invested, should not be burned out to such a degree that the investment is weakened by the heat, and should be cast in a cold mold.

CAUSES OF FAILURE OF CAST GOLD INLAYS.

In conclusion let us state that by far the great majority of the failures of the gold inlay are attributable to a faulty cavity preparation, which causes the inlay to fall out of the cavity. I have no doubt that such a preparation would be the cause also of recurrent caries if the inlay stayed in long enough for such recurrence, for in most cases which have come under my observation the extension form had been wofully ignored. This cause of failure can be corrected by a study of cavity preparation and the observance of the laws relating thereto as laid down by Black.

Another cause of failure is the omission of a proper beveling of the margins.

The third cause of failure is the use of pure gold in inlays upon which a great deal of stress falls; such gold will, as a result, often flow to so great a degree as to overhang the surface of the tooth.

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I am a firm believer in the gold inlay as a means for saving a tooth in which it has been properly placed, so much so that the cast gold inlay is taking an increasingly larger place in my practice as time goes on and I have the opportunity of observing its beneficent office in the saving of the teeth of my patients, together with a degree of comfort in its insertion that was never remotely approached by the gold filling.

DISCUSSION.

Dr. HENRY W. GILLETT, New York. It is not easy to discuss a paper which is a statement of the best practice in any specialty. Discussion of such a paper must be largely confined to commendation, and to an emphasis of the most important items presented.

I wish to refer first to the choice of gold for cast inlays. The essayist speaks of the alloying of twenty-four karat gold and of twenty-two karat gold. I have been so well pleased with the results of the use of an alloy composed of twenty-four karat gold and at least two and one-half per cent. of platinum that I wish to call your attention thereto. This alloy seems to offer just about the right degree of resistance for occlusal surfaces, and it is sufficiently ductile to permit of satisfactory burnishing for the perfection of the margins.

Dr. Conzett referred to the argument which we hear so frequently presented, namely, one of the objections which is being constantly raised by the advocates of the foil filling is that the cast inlay requires broader cutting—greater sacrifice of tooth structure. I wish to read the paragraph in question: "The preparation of a cavity is practically the same for an inlay as for a gold filling, the only possible difference being that in the preparation for a gold filling some undercut retention is permissible, while for an inlay this is of course absolutely prohibited."

The essayist has spoken of the "saving of the teeth." Dr. Johnson used the same expression several times yesterday. I feel that it is time we should outgrow that expression and employ a broader term. Many a tooth has been "saved" with but little advantage to the patient. It is time that we as a profession realize the saving and restoring of the efficiency of teeth, nay, the efficiency of the masticating organ, as our field. I believe we focus our attention too closely on the individual tooth, and need to study more carefully the function of the masticating organ as a unit, and the relation of the individual tooth to the whole organ. One of the marked differences between the results of foil fillings and cast inlays in cavities involving occlusal surfaces is the difference in efficiency of mastication. It is comparatively easy to restore the cusps, fossæ, sulci, and marginal ridges on which that efficiency depends, when cast inlays are used. It is not feasible within the bounds of reasonable demands upon the strength of either patient or operator to restore the enumer-

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ated features of occlusal surfaces with gold foil. The much increased efficiency of such surfaces when lost portions are replaced with duplicates normal to that case is sufficient warrant for a much freer cutting than would otherwise be permissible. If conditions are such that the removal of a foot will conserve and increase the efficiency of an individual, then it is good practice to remove it. Likewise, if the removal of a part of any tooth will be more than counterbalanced by the benefit accruing to the individual, then there is need for caution in accepting the dictum that the removal of such a part is a sacrifice.

Dr. Conzett has referred to the discrediting of inlays by reason of failure to produce creditable results, and of unseating of inlays. Inlay systems have now reached a status where no dentist can have a legitimate excuse for either kind of failure. If they occur habitually in any practice, they necessarily stamp either the practitioner's standards or his methods, or both, as inexcusably faulty. They lay upon him the responsibility of reforming one or both. Our opportunity at the present time is a broad and wonderful one, but upon us is laid the responsibility of improving that opportunity. This can only be done by maintaining our standards individually as well as collectively.

Dr. A. R. Cooke, Syracuse. The subject of cavity preparation as presented by the essayist has been so extensively discussed before this society and its component district societies that I feel unable to add much of interest. It seems to me that the theory of extension may be, and in many cases is being carried to excess. The determination of the amount of extension requisite in each individual case is a matter of judgment. Endless trouble may be entailed upon an unsuspecting public during the formation of a mature judgment by young practitioners, owing to their lack of due consideration of the vital forces of the organs upon which they are operating.

It was recently my privilege to examine a large number of specimen cavities prepared by the older students of one of our prominent dental colleges. I was impressed with the beautiful work, and admired their adherence to the principles of cavity preparation as advocated by the essayist; I noted the similarity of each case to that of its neighbor, and from the mechanical standpoint was unwilling to criticize the work. We all know that the gentlemen who have preceded me have the judgment, acquired by experience, to apply these principles successfully in their daily practices, but —like a large number of others—I find myself unable to make the extensive preparation advocated in every case without often involving the pulp, or at least endangering it from thermal shock. We shall have a reaction in this practice, as we have had in other lines, and the greatest good will be accomplished by the conservative operator.

It is a common occurrence in the practical licensing examinations conducted in this state that the candidates make unnecessary pulp exposures in the preparation of these cavities, and I have seen a large number of similar errors made by otherwise careful operators.

The passing of the use of non-cohesive gold in the form of hand-rolled cylinders is to be deplored. Many operators of the past generation were skilled in this method, and were able to produce beautiful results in a fraction of the time required by the present system. The

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adaptability of this particular form of gold to the cervical wall rendered its use specially desirable, and somewhat obviated the necessity for extreme extension. The preparation and insertion of a good inlay requires as much skill and often more time than the insertion of a good gold filling, and the choice of process is dependent upon the ability of the operator to produce results. The young men of the profession are inclined to use the inlay wherever possible, whereas some of the older practitioners prefer the foil filling. My experience with the five per cent. platinum-and-gold alloy for inlays has not been entirely satisfactory. It seems to have more shrinkage than pure gold, and I have been unable to burnish the edges as closely as desired.

Dr. H. E. S. Chayes, New York. I am sorry that Dr. Conzett's effort seems to have awakened so little interest, and I am going to ask your indulgence to allow me to discuss his paper.

At the outset I may say that there is hardly anything in Dr. Conzett's paper that anyone may disagree with, but there are so many points upon which he has not touched and which he has not fully emphasized that I, as one interested in this particular branch of our work, feel it necessary to raise my voice in justice to myself and to him who is responsible for the awakening of interest in that unquestionably established treatment, namely, Dr. Taggart. Inlay work is no longer an experiment. Contrary to all expressions and belief of the older practitioners that there is still a great deal of room left for malleted gold fillings, these men will find themselves in a gradually but constantly diminishing minority, and the quicker they recognize that fact and begin to master the technique of inlay work, until they have almost eliminated from their practices that long-hailed and much-worshipped material, the gold foil filling, the better it will be for their patients and themselves. Perfection means one thing and one thing only—*perfection*. The insertion of an inlay the margins of which it has not been found necessary to burnish, if the cavity has been properly prepared and every step has been followed according to the principles laid down by Taggart six or seven years ago—which it has not yet been found necessary to change in order to render them more perfect—will fill every demand of every sincere operator who works for the interest of his patients. The softening of the wax in water at from 140° to 148° F., and the force exerted in holding the wax within a cavity in order to overcome the molecular tendency of the wax toward changing when once forced into position will be sufficient to remove the bugbear so much talked about in journals, namely, the shrinkage and expansion of wax, which cause microscopical changes in the inlay. The selection of a proper investing compound, the proper temperature and quantity of water, the taking into account of the humidity of the atmosphere, the proper mixture and the careful application of a creamy mixture of investment compound to every part of the wax model, care in eliminating air-bubbles, and finally the proper drying-out and heating of the investment, the proper burning-out of the wax within the flask, and finally casting in a cold mold, as mentioned by Dr. Conzett and repeatedly referred to by Dr. Taggart, will eliminate the myriads of difficulties which some operators have made for themselves by not following a proper technique. It is a peculiarity of the human mind that the moment anything

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new is offered, it is immediately opposed. We should first fairly and calmly investigate the merits of an innovation, and not until we have studied its possibilities are we justified in either adopting or discarding it. It is hardly possible that when a man offers to a scientific body some thought upon which he has spent years of careful study, we shall be able in a moment to pass a verdict upon its value. As an illustration, the author of the paper preceding the one under discussion pointed out the close interdependence and relationship between the functions of all organs in the human body. The dentist places an inanimate appliance in a vital environment with the expectation that it will take a part in the maintenance and preservation of the vital organism. He must therefore exercise extreme care in all such operations. It is impossible to judge hastily a method as being defective which has been evolved by a man who has spent a lifetime in perfecting it. Such a method must be religiously followed step by step, in order to insure perfect results.

Not so long ago, railroad tracks were laid in short sections, bolted together in such a manner as to leave room for the shrinkage and expansion of the metal. This method has been abandoned, because it was found that, if the holding force is sufficiently strong, the tendency to linear change in the rails can be overcome. In other words, there is no force that cannot be overcome by a greater force. Thus we can overcome the shrinkage of gold by applying sufficient pressure to overcome it; this pressure, of course, must not be so excessive as to force the investment apart, but just enough to overcome the tendency of the gold to shrink. The addition of two and one-half per cent. platinum to pure gold is a good suggestion. Platinum can be combined with gold up to ten per cent. of platinum, if the work is done carefully and impurities are kept out.

Dr. W. A. Price, Cleveland, Ohio. I rather fear to discuss this question, because I know my weakness when I get to speaking on a physical problem like the one under discussion. I am reminded of an incident which happened in Washington a few years ago, when the famous Dr. Murray, who corrected the atomic weight of hydrogen, was working in the department of Weights and Measures. Someone inquired if he could furnish from that department a ruler that would be absolutely straight; that he wanted it as soon as possible, and asked what the cost would be, etc. Dr. Murray replied that a ruler could be made accurate to one-tenth of a millimeter for the distance of one-fourth of a meter, that the expense would be practically eleven hundred dollars, and it would require about two years to make it. The man wrote back that he wanted just a good straight ruler. This simply showed that the man had no conception of what the word "perfect" means. Speaking of relative exactness, we have a number of men in our part of the country who have the confidence that they do things to the absolute gage, and they use the words "absolute" and "exact," etc., with great confidence and freedom. It has been not unusual to hear men make the statement that they could cast a crown base that would absolutely fit. I have had the privilege of working out the physical determinations of wax and gold, and found that absolutely accurate reproductions could not be made. As a result of these findings, a series of tests were made by different members of the profession, and a prize of one hundred and fifty

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dollars was offered by me for any member of the profession who would produce a cast restoration which would go to place within one-fiftieth of an inch. The form that was provided consisted of a taper column one-fourth of an inch in diameter, the taper of the sides to be one per cent. per inch with respect to a perpendicular. This form was expected to reproduce, approximately, the conditions that obtained when casting a gold base for a molar porcelain crown where the gold extended over the bevel of the porcelain as well as over a bevel on the roots. This condition provided for the reproduction of both an inside and outside dimension at the same time. The outside dimension, represented by the periphery of the root and the base of the porcelain, was represented by the taper column, the inside dimensions being the pulp chamber and post-hole in the porcelain. A number of restorations were made for this form by operators living in different parts of the country. The conditions for securing the prize required that the ring go to place over the outside dimensions and in the inside dimensions of this form to within one-fiftieth of an inch; but the competitors' attempts failed. What was the reason? It soon became evident that defects due to human error appeared in the restoration, and the men who used a cold investment and obtained by that means abnormal contraction of the wax, had their inlay stand that much higher than the form for which it was made, and we could every time, by adding the contraction of gold, viz, 2.2 per cent. to the manipulation of a given wax, tell what procedure had been used, and it always added up accurately mathematically. A definite amount of contraction always occurs in the cooling of gold, viz, about twelve per cent. of its volume from the molten state to room temperature, but about five per cent. of this contraction occurs at a certain point in the change of temperature by less than one degree. The larger part, therefore of the contraction of gold from its crystallizing point to normal temperature amounts to about seven per cent. of its volume, or 2.2 per cent. linear. It is this large fixed error, due to the contraction of the gold after it leaves the molten state, which presents the greatest difficulty for which we have been seeking to find a solution. Since the contraction of gold is a constant factor and of a definite amount, we may systematically introduce an error which will precisely compensate for the contraction of the gold, and this can be done by the manipulation of the wax pattern. By certain manipulation enough expansion can be produced in almost any wax on the market to compensate for the contraction of the gold. By warming the wax its elasticity is released, and an error in expansion is created sufficient to overcome the contraction of the gold.

A little experiment will show very clearly the effect which the elasticity of the wax may have on the finished inlay. Two pieces of inlay wax are placed in warm water and heated to their low working range. One of the pieces is removed, stretched and plunged into cold water to chill, thereby retaining its elasticity. The other piece is condensed by pushing it together endwise and chilled. While it is cold, a section one inch long is cut from each of the pieces and attached to a sprue; then investment is mixed with water of the temperature of the high-working range for the wax used, and the piece is invested. The warm investment releases the elasticity of the two wax pieces like the thawing of a

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frozen stretched rubber band. Each relaxes to its normal molecular state of rest, the elongated one shortening, and the shortened one elongating. This change in the wax after it is invested is prevented by releasing that elasticity while the wax is in the form, the procedure being as follows: When we make a mesio-occlusal-distal pattern and chill it in the cavity, the wax contracts, and, being held, takes on a condition of elastic strain. If this pattern is removed from the form or tooth, after being chilled, and we undertake to introduce an expansion sufficient to overcome the contraction of the gold, the warming of the pattern releases this elasticity and produces a distortion. If, however, we remove the wax while it is warm and place it in cold water, producing a contraction without strain, it does not take on an elastic stress. It would, however, be too small to go back into position in the form or tooth. If now we break it across the occlusal surface while keeping it chilled, and replace it in the form, we will have quite a wide crack between the broken surfaces. We then take a wedge of new wax and force it into this opening, after softening the edges with a warm instrument. This will introduce enough new wax in that particular part which has to do with our outside dimensions, so that, when the pattern is removed and invested in a warm investment, the temperature of which is dependent upon the formula of the pattern material, we produce sufficient expansion of the mass of wax so that it will readily go over the outside dimensions.

Another suitable method consists, instead of breaking the pattern, in cutting it across the occlusal surface with a sharp knife in one or two places before chilling it in the tooth, thereby allowing the contraction to express itself at the point of separation; after producing the contraction, we insert additional wax as before. This will introduce an expansion correction in the wax which will be more than sufficient to compensate for the fixed contraction of the gold.

Another method consists in putting into the occlusal portion of the wax pattern a metal that has a low coefficient of expansion, viz, one-quarter of that of gold.

These are some of the methods by which we can control a large part of the error observed in mesio-occluso-distal fillings due to the expansion and contraction of the wax and gold. It is therefore very necessary to know exactly the expansion and contraction at various temperatures of the particular wax used, and to manipulate it so as to introduce just the proper amount of expansion to overcome the contraction of the gold.

Dr. CONZETT (closing the discussion). I wish to thank you for the very kind reception accorded to my paper, which is confessedly incomplete, as it was absolutely impossible in the time at my disposal to cover the subject. That is the reason why I have not gone into detail in regard to some of the points mentioned by Dr. Chayes, and which must be carried in mind in any inlay technique and cavity preparation. I was glad that Dr. Gillett emphasized the restoration of the function of the tooth. A filling or an inlay which reproduces lost tooth tissue and does not perfectly reproduce the function of that tooth is a failure. I have frequently removed fillings that seemed perfect except that they did not restore the mesio-distal diameter of the tooth, hence did not restore the function of the tooth, and in order to correct such defects I have removed fill-

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ings apparently perfect in every respect, inasmuch as they prevented recurrent caries. The restoration of sulci and cusps is more easily made in an inlay than in a gold filling. In regard to the question of extension for prevention, operators who are cutting teeth all to pieces are not following Dr. Black, and the operator who exposes a pulp in making an extension is lacking in skill. The extension is not made toward the pulp of the tooth, but in the surface of the tooth.

I do not wish to go into the question of the expansion of wax, but, as Dr. Price says, the factors of expansion and contraction can be controlled largely. I wish to join Dr. Chayes in his tribute to the genius who brought out the cast inlay. It is almost impossible for us to appreciate the tremendous amount of work which Dr. Taggart has done in this field. He made magnificent inlays when the method was first brought out, and those practitioners who are carefully following his technique are making magnificent inlays today. So many are casting in hot molds, using an investment material which is disintegrated, and instead of controlling the expansion and contraction get a breaking-up of the investment material and a distortion of the inlay. If the wax is properly introduced into the cavity, as Dr. Price has said, and if the inlay is cast in the mold at the proper temperature, there will be a shrinkage in the gold that we cannot get away from, but which we can overcome. I have demonstrated that for one and the same model, we can make with the same wax one inlay that will rattle, and another inlay that cannot be forced into the cavity because of the expansion of the gold, the difference being due simply to the different temperatures of the flasks in the casting.

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Report of the Correspondent.

By E. B. PRENTISS, D.D.S., New York.

Nitrous Oxid Analgesia in General Dental Practice.

FOR a great many years, nitrous oxid has been employed as an anesthetic in the extraction of teeth. For such operations it has justly earned a great reputation, because of the comparative ease of its administration as well as the lack of any ill-effects upon the patient. It has been known as the safest of all general anesthetics. The general surgeon has made more or less frequent use of it for minor operations, especially short ones; also, during more recent years, he has come to use it quite generally as an easier, quicker, and more pleasant method of beginning the anesthesia when ether is to be used in continuance during long operations.

During the last five or more years the attention of the dental profession has been called to the possibilities of nitrous oxid combined with oxygen as a means of producing a condition of analgesia, which may be continued for a considerable period of time, sufficient, at least, for performing all ordinary operations about the mouth and teeth.

THE OPERATOR'S RESPONSIBILITY.

Very little seems to be known about its action or effect upon patients by the average dentist, and I think the majority of us feel that it has not had a sufficient test to warrant us in assuming the added responsibility for the safety of the patient which its use imposes upon us. This responsibility seems to be considerably out of proportion to the importance of the average dental operation in which its use is indicated.

Within the past two or three years, especially, there has been great activity on the part of the manufacturers of different machines. I feel that nearly all, if not all the knowledge which most dentists have of nitrous oxid and oxygen has come through the *so-called* "Special Courses in Anesthesia and Analgesia" conducted by men who are paid to advertise these machines. These men, being graduated dentists and having spent a great deal of time in perfecting themselves in administering nitrous oxid, have been able to convince a good many practitioners throughout the country that it is a "very simple matter for anyone to become proficient in its use after a few trials."

A comparatively few have become proficient in its use, and have found it of great benefit in their practices. To

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hundreds of others, however, it has undoubtedly been a disappointment, while in the hands of a great many other operators, it is a source of great danger to the patients who intrust their lives to their care. In conducting my investigation on this subject, I have carefully avoided obtaining information from anyone who is known to be interested personally in the manufacture or selling of any apparatus.

INQUIRIES ADDRESSED TO DENTISTS AND PHYSICIANS.

I have tried to conduct this inquiry along purely scientific and professional lines, and hope that this report will be entirely free from all commercial influences.

Two forms of letters have been sent, one to dentists and another to physicians or surgeons. The following is a copy of the letter sent to dentists:

My dear Doctor,—As Correspondent of the New York State Dental Society, I am seeking information upon the subject of "Nitrous Oxid Analgesia in its Relation to General Dental Operations."

Will you be kind enough to state your personal opinion, if possible based upon clinical experience, regarding the following questions:

(1) In about what proportion of your operations do you find nitrous oxid analgesia of benefit either to your patient, yourself, or both?

(2) Do you find that the present-day equipment is perfected to such a degree that it incurs no great inconvenience to the operator in his work? And is an assistant required to handle the apparatus?

(3) Do you consider that the dentist should take any special course in anesthesia in order to qualify for the safe administration of nitrous oxid in operations of considerable duration?

(4) In what proportion of cases have your patients experienced bad effects from its use?

(5) Considering the subject from all possible angles, is it your opinion that nitrous oxid should form a part of every dentist's equipment?

An early reply will be appreciated, in order that I may incorporate it in my report to be given at the annual meeting of the State Society in May.

Thanking you in advance for any information you may be able to give,

Very truly yours.

The letter sent to physicians was the same, except the questions, which were as follows:

(1) In administering nitrous oxid and oxygen for continued analgesia as required in ordinary dental operations, what are the probable or possible ill effects, if any, upon the system?

(2) Do you consider that the dentist should take any special course in anesthesia in order to qualify for the safe administration of nitrous oxid in operations of considerable duration?

(3) Considering the subject from all possible angles, is it your opinion that nitrous oxid analgesia would be a safe adjunct to the average dental operation?

The replies received, except in two or three instances, were brief. They are as follows:

REPLIES FROM DENTISTS, FAVORABLE AND UNFAVORABLE.

(1) Dr. T. B. HARTZELL, Minneapolis, Minn.:

My dear Dr. Prentiss,—In answer to your first question, would say that I find nitrous oxid analgesia of advantage in all minor operations upon the teeth where the matter of avoiding pain is a consideration.

In reply to question No. 2, would say that my answer to that question depends on the character of apparatus used.

There are three types of apparatus in use for the administration of nitrous oxid: The first is one in which there is no attempt to control the dosage, in which the patient is given full inhalations of nitrous oxid until he reaches the condition of anesthesia; then there is nothing to be done but to cease administering and operate. That is a very old type of apparatus.

The next type of apparatus seeks to control the flow and mixture of the gases, and in

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this type the manufacturers usually provide two bags, each holding about a gallon, oxygen being discharged into one and nitrous oxid into the other, and allowed to mix according to the symptomatic needs of the patient and the judgment of the anesthetist.

The gases in this type of apparatus, coming in some cases directly from the cylinders to the bags, are held in moderate restraint by pressure regulators, which roughly indicate the amount of gas flowing. Of this type of apparatus there are several on the market, notably the Teter, Clark, McKesson, and others.

The third type of apparatus, the most perfect of all, is so devised that the gases can be administered in known quantities and the percentage of each gas accurately controlled, and this control is so perfect that the operator can, after arranging his anesthetizing machine to deliver a certain mixture of nitrous oxid and oxygen, depend on that mixture remaining constant, thus giving an even, satisfactory anesthesia in which it is impossible to overdose the patient, because the machine will not permit of the patient's receiving more than a certain accurate flow of the combined gases. In this type an assistant is not required to handle the apparatus, and any change in the proportion of the gases flowing is indicated by delicate gages, which instantly record that fact in full view of the anesthetist.

In answer to your third question, would say that I do consider that everyone who attempts the matter of general anesthesia should have special instruction in general anesthesia from a man who thoroughly understands the science of anesthesia; *not from some traveling salesman* who is out to sell the apparatus.

In reply to the fourth question, would say that when the gases are accurately proportioned and carefully administered there are no bad effects, if the individual to whom the gas is being administered has been properly prepared for the anesthetic. If, on the contrary, the anesthetic is administered immediately after eating, there will be a certain amount of nausea and depression in many cases, and this is just as true of nitrous oxid and oxygen as of ether, chloroform, or any other anesthetic. Proper time and condition of the administration is important in anesthesia as well as analgesia. The digestive processes are inhibited under general anesthesia, and if the stomach contains a mass of partially digested foods, fermentation and nausea will ensue under any anesthetic.

There is still another factor in the preparation of the patient which is vastly important in any type of anesthesia, whether it be produced by gas, ether, or chloroform; this is the existence of fear or anger on the part of the individual being anesthetized. During fear or anger, the physiological action of certain glands of the body produces substances which in exaggerated amounts vastly increase the danger of the anesthetic to the individual.

In regard to the last question, would answer, No. The nitrous oxid equipment should form a part of every man's equipment who is capable of using it, and who has work that demands its use. I would like every dentist to equip himself with a microscope, but how many dentists do you suppose would use a microscope, if they had one? I will say this, however, that every dentist who desires to practice painless dentistry and who will train himself in anesthetic matters will be given increased comfort and so will his patient, if he does make such apparatus a part of his equipment.

Very cordially yours.

(2) Dr. CHAS. F. ASH, New York City.

My dear Dr. Prentiss,—Replying to yours of March 28th, in answer would say:

(1) I suppose I use nitrous oxid in 20 per cent. of my cases.

(2) Equipment is not perfected to a degree where it incurs no inconvenience to the operator, and I believe the equipment is capable of much further development; I believe also that an assistant should be a graduate nurse, and that such an assistant is absolutely indispensable for satisfactory results.

(3) I believe any person administering nitrous oxid or any other anesthetic should make a special study of anesthesia in order to qualify for its safe administration.

(4) I believe I have not seen any bad effects from the use of nitrous oxid. I have seen but one patient who had any disagreeable symptoms after the operation, but that was directly attributable to other causes and not to nitrous oxid.

(5) In answer to question No. 5, I am not prepared to say that it should form a part of every dentist's equipment by any means. I believe that nitrous oxid, while satisfactory in the hands of some people, will be more or less unsafe in the hands of many others.

Very truly yours.

(3) Dr. J. R. HASBROUCK, New York City.

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My dear Doctor,—I have been most derelict in disregarding an immediate reply to your letter, and apologize for my rudeness.

Herewith is expressed my observation based upon five years' experience with $N_2O + O$.

In ninety per cent. of cases it ameliorates the unpleasantness of painful operations both to patients and myself.

The modern apparatus seems to me to be faultless, but the necessary efficiency can only be realized when an assistant is employed who is sensitive, alert, and possesses a physiologic and psychic understanding. I consider the services of a qualified assistant absolutely necessary both for the safety and sequential administration of the anesthetic, whether it be carried beyond analgesia or not.

In cases of prolonged anesthesia, I consider it most presumptuous and hazardous for anyone to administer $N_2O + O$ unless a special training and experience has been had.

I can report no conspicuous ill effect save an occasional slight headache or lassitude.

In justice to one's patients and self, I deem $N_2O + O$ a most necessary adjunct in the practice of dentistry, but its intelligent and conservative use should be observed.

Appreciating the honor of your inquiry, I am,

Most faithfully.

(4) Dr. Weston A. Price, Cleveland, Ohio.

My dear Dr. Prentiss,—Your communication of the 28th is received, with its list of questions relative to nitrous oxid analgesia. Without repeating the questions, the answers I would give would be as follows:

(1) Less than ten per cent.

(2) (*a*) Present-day equipment is very satisfactory; (*b*) an assistant is not required to handle the apparatus, but should always be present.

(3) Yes, if he has not had experience.

(4) Probably twenty-five per cent. of cases are short of satisfactory.

(5) No, not if he is skilful in using other available methods. A great help for a few patients, however.

In regard to your postscript, I would recommend that you write to Dr. George N. Wasser, New England Bldg., who is an enthusiast in its behalf, but not interested, so far as I know, in any machine.

With best wishes, I am,

Yours very sincerely.

(5) Dr. George T. Gregg, Pittsburgh, Pa.

(1) About 2/3, but am using less nitrous oxid; using conductive anesthesia instead.

(2) The apparatus could be improved, especially inhalers. An assistant is essential.

(3) Should take a course.

(4) About 10 per cent.

(5) $N_2O + O$ should be in any office equipment, but I think conductive anesthesia is going to replace it to a very great extent.

(6) Dr. J. D. Hertz, Stamford, Conn.

My dear Dr. Prentiss,—In answer to your inquiries of March 28th, regarding the use of nitrous oxid, I shall be very glad to give you whatever information I can as to my use of same. We have a record of over 700 cases since November 1, 1912; previous to that time we kept no record.

In answer to question No. 1, I would say that I find nitrous oxid analgesia of benefit in at least one-third of my cases, and most decidedly think it of benefit to my patients and myself.

(2) In the great majority of cases I find the equipment of very little inconvenience, and an assistant is not required to handle the machine, as it is seldom that it needs much attention, if it is once set at the analgesic point. But I would not think of using nitrous oxid or any other anesthetic or analgesic without the help of an assistant.

(3) While I think that all the information the beginner can get in the use of anesthesia and analgesia will help him in its administration, on the other hand no amount of theory will give him that proficiency which he can gain only by experience.

(4) Our record shows 21 cases of vomiting and 12 that did not feel normal for from one to several days, and we have had about half a dozen cases that we could not handle at all under either analgesia or anesthesia.

(5) At the present time I am very partial to nitrous oxid, and think that analgesia and anesthesia should be practiced in every office for the alleviation of a great deal of pain that it is otherwise impossible to relieve.

Trusting that the above may be of some slight service to you, I beg to remain,

Yours very truly.

(7) Dr. Geo. N. Wasser, Cleveland, Ohio.

My dear Doctor,—In answer to your questions on "Nitrous Oxid Analgesia in Its Relation to General Dental Operations," contained in your letter of March 28th, would say:

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(1) Over 75 per cent.

(2) (*a*) Yes. (*b*) Not necessary, but advisable.

(3) Not necessary for analgesia, but advisable for anesthesia.

(4) Have been giving it over five years, and have never had an unfavorable symptom, and but four cases of nausea.

(5) The dentist who does not make use of nitrous oxid and oxygen is missing the greatest boon that has come to the profession, with the possible exception of the casting process. It gives me great pleasure to answer these few questions, as it gives me an opportunity to express my appreciation of nitrous oxid and oxygen, and tell in part of the beneficial results to both patient and operator.

Sincerely.

The following letter coincides so nearly with my own view of the matter and sounds such a timely warning that I have placed it at the end, where it will leave a lasting impression:

(8) Dr. HENRY W. GILLETT, New York, N. Y.

Dear Dr. Prentiss,—The following is in reply to your questions concerning nitrous oxid analgesia:

(2) (*a*) No. (*b*) Yes.

(3) Yes.

(5) No, not in its present stage of development.

I have not made enough use of the process to answer questions Nos. 1 and 4.

In spite of the safety of nitrous oxid as an anesthetic, I remain unconvinced that it is right for any operator to assume, as regular practice, the responsibility for the management of an anesthetic, and at the same time carry on an operation that ordinarily requires all his faculties to bring to a successful issue.

Analgesia may at any moment become anesthesia; in fact, the advocates of the practice state that they frequently induce anesthesia at difficult or critical moments.

It is my belief that the fact that an operator has at hand a trained attendant or trained nurse will not provide legal protection for him in case of unfortunate results with an anesthetic used as recommended by the advocates of nitrous oxid analgesia apparatus. If his legal obligations are not safeguarded, then his moral obligations are surely in a precarious situation.

It is a well-recognized principle in surgical practice that the administration of anesthetics and surgical operations are not to be carried on by the surgeon at one and the same time. It is also a recognized principle that the anesthetist should be competent to care for and safeguard the life of his patient in any emergency arising from the use of the anesthetic. I feel that these two points have been minimized by the commercial advocates of nitrous oxid analgesia.

It is to be borne in mind that the present interest in the practice is chiefly commercial —that it is a part of a skilfully organized and sustained selling propaganda on the part of people interested solely in the financial returns, and that, of the thousands of analgesia outfits sold to the profession, not twenty per cent. are in practical use.

It is an unfortunate fact that it seems possible for any manufacturer to command the services of professional promoters, equipped with a high degree of skill and efficiency in the practice of almost any special process, who will gravely assure the profession that duplication of the results—which they have spent years in training themselves to demonstrate so easily and perfectly—is readily possible for any dentist of "ordinary skill." No matter how complex the process, it is only necessary to take a course with the demonstrator at $50 per course, and—presto! throngs of grateful patients and eager competition for a place on the waiting-list!

I believe the ultimate outcome of this commercial effort will be to leave the profession hundreds of thousands of dollars poorer with only some handsome junk to show for it, and to again demonstrate that the professional man, who sells his services to the supply houses as a promoter, either openly or secretly, should be barred from all professional association.

In writing this I do not forget that a few men have given the requisite study to equip themselves for this work, and I realize that they are giving good service. Neither can I forget that, regardless of their efficiency and knowledge, if they assume responsibility for both anesthetic and operation, they are violating recognized surgical standards. Under these conditions, if by any mischance a fatal accident occurs as a result, the expert testimony of the professional anesthetists of the highest standing, so vital to their defense, is likely to be highly critical if not flatly condemnatory.

Yours very truly.

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REPLIES FROM PHYSICIANS.

The following replies were received from physicians and surgeons:

(1) Dr. EDWARD M. FOOTE, New York.

Dear Dr. Prentiss,—You can find my views on the subject of nitrous oxid gas in the last edition of my book on "Minor Surgery," in which there is a chapter on the different anesthetics.

Answering your questions specifically, I do not think there are any probable ill effects from its use in dental operations, subsequent to the period of the anesthesia. There is, however, a certain amount of danger attendant upon its use, and for this reason, in answer to question No. 2, I should say positively, Yes.

I should say in answer to question No. 3, Yes, if the gas is properly administered by a competent individual.

Incidentally, one might remark that taking a course in medicine does not qualify one to give an anesthetic properly. If such were the case, the hospital interne would never have gained his unenviable reputation for poor anesthesia.

Sincerely yours.

(2) Dr. ALEXANDER LAMBERT, New York City.

Dear Sir,—I am in receipt of your letter of April 2d asking me to furnish certain information as to "Nitrous Oxid Analgesia in its Relation to General Operations."

Being a medical man, I am not competent to answer all your questions, for they come under the head of surgical experience and of experience of men who give the anesthetic. There is one point, however. in the second question, as to whether a dentist should take a special course in anesthesia in order to qualify for the safe administration of nitrous oxid. I think there is no question whatever, in answer to this, that he should take such a course. The mere fact that the greater the ignorance the greater the self-confidence in giving the anesthesic is not conducive to the greatest safety to the patient. I have seen a great deal of anesthetics given, both before there were special anesthetists in this city and since then, and I have noticed an enormous difference in the resulting effect upon the patients since anesthetists have come into vogue. There have been less accidents, the patients have recovered more quickly, they have needed less anesthesia, and in all ways it has been better for both patient and operator.

Yours truly.

(3) Dr. ROBERT T. MORRIS, New York City.

My dear Doctor,—Answering your letter of April 2d: Dr. R. C. Coburn, of Broadway and 86th st., is perhaps our best authority on the subject of nitrous oxid and oxygen anesthesia. Answering your questions, however:

(1) The chief danger appears to consist in the patient's coming out from under the influence—while we are at work—sufficiently to suffer from the effects of the strong stimulus or shock being sent into the centers of consciousness from the field of operation.

(2) I should consider it by all means desirable for the dentist to take a special course in anesthesia, in order to qualify for the safe administration of nitrous oxid or its combination anesthetics.

(3) Nitrous oxid anesthesia is perhaps the safest adjunct among anesthetics for the average dental operation.

Yours truly.

(4) Dr. KARL CONNELL, New York City, assistant surgeon, Roosevelt Hospital.

My dear Doctor,—In reply to your questions, it is my belief:

(1) That continued analgesia will have no detrimental after-effects except occasional headache and nausea, providing that the gases be pure, and nitrous acid poisoning be avoided.

(2) Nitrous oxid for prolonged operations is far more dangerous in unskilled hands than ether and chloroform; high training is essential.

(3) Nitrous oxid analgesia, with a percentage of from 8 to 20 per cent. oxygen and allowing some dilution with air, will be a safe adjunct for dental practice. At present, proper control of amount and percentage is not obtainable except by the experienced administrator.

Sincerely yours.

(5) Dr. R. C. COBURN, New York City (of whom Dr. Morris speaks).

Dear Dr. Prentiss,—Replying to your letter of the 6th inst., I would make the following answers to your questions:

(1) The *probable* ill-effects resulting from nitrous oxid and oxygen in continued analgesia, if the blood is kept well oxygenated, are nearly *nil*. There are, however, some *possible* ill-effects, especially in those suffer-

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ing from cardiac disease and arterio-sclerosis. Cyanosis increases the blood pressure, thereby throwing extra work upon the heart. Any increase in blood pressure, in some subjects, renders cerebral hemorrhage more probable, and, by throwing extra work upon the heart, functional failure may be induced. Patients suffering from advanced stages of such diseases, however, are not ordinarily dental subjects. Very much, if not all, depends upon the skill with which nitrous oxid and oxygen is administered. Finally, the aspiration of vomited material must not be wholly disregarded.

(2) and (3) Yes.

Sincerely yours.

The last two gentlemen, Drs. Connell and Coburn, are especially qualified to speak on this subject, having had a great deal of experience with anesthetics of various kinds, and lately having been doing a great deal of special work with nitrous oxid and oxygen.

SUMMARY.

I wish to take this opportunity to thank those who have so willingly and thoughtfully replied to the letter of inquiry sent. Judging from the proportion of answers received, this report is the most successful of any during the three years in which I have served as your Correspondent. Of eleven sent to dentists, eight replies were received, and of eight letters sent to physicians, five replies were returned.

The letter from Dr. Hartzell is especially valuable, because of the detailed information it gives. There seems to be such a difference of opinion in regard to most of the questions that it would be difficult to attempt to condense them in such a manner as to draw any definite conclusion.

However, as nearly as I can judge from careful perusal, the majority seem to think that $N_2O + O$ is of benefit in quite a number of the very painful operations; that a capable assistant should be at hand if not actually needed; that special training is absolutely necessary for its safe administration; that ill-effects are produced in about 10 per cent. of the cases operated on, and that the apparatus should be in the offices of only those who are perfectly competent to use it intelligently. I would call special attention to the statement of Dr. Karl Connell, assistant surgeon at Roosevelt Hospital, New York, a man who has made a very special study of all anesthetics. He says that *"$N_2O + O$ in unskilled hands is more dangerous than either ether or chloroform."*

There are a few points, as yet not mentioned in the report, which I hope the discussion will bring out.

One, which it seems to me is very important, is the liability of cutting beyond the safety point while the patient is under analgesia, thus bringing about the subsequent death of the pulp.

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DISCUSSION.

Dr. JAMES F. HASBROUCK, New York, N. Y. I have read the report of our Correspondent with a great deal of interest. There is unquestionably, at the present time, a feeling of uncertainty as to the practical value of nitrous oxid and oxygen as used by the general practitioner for producing analgesia during dental operations. I am not prepared to commend its use as an analgesic pure and simple—my own experience, comprising a rather long series of cases, being that whenever any part of the operation would really produce actual pain, the only method of eliminating shock is the induction of anesthesia. Analgesia may be excellent in selected cases; we are perfectly willing to accept the statements of those who report this, but I should like to know whether or not, at critical moments during their operations, anesthesia is not induced. Should nitrous oxid and oxygen form part of every dentist's equipment? This is a different question. Offhand, one would be tempted to answer Yes, but we must make so many qualifications that my answer would be No—excepting that I believe Dr. Hartzell is entirely correct in his statement that the equipment should be in the office of every man who is capable of using it and who has work demanding its use.

Observing the data at hand, there seems to be a unanimity of opinion regarding the qualifications of the administrator of nitrous oxid and oxygen. I am quite in accord with this opinion, and believe that one should receive special instruction from one qualified to teach, and by this I mean to imply that I do not consider a demonstration or two by the exploiters of an apparatus sufficient for this purpose. A trained and experienced assistant should always be present. I know that many will think that all of this preliminary preparation is unnecessary, but as one acquires experience in the administration of these gases, I think he will agree with Dr. Connell's statement that nitrous oxid and oxygen in unskilled hands is more dangerous than either ether or chloroform. It is not the easy cases that we are here to discuss—they will take care of themselves; anyone can handle an easy case. But the difficult cases are exasperating, and we seldom know beforehand when complications will arise. It is the emergency which we must provide for; therefore I should strongly advise against adopting the use of this method either without proper instruction or without having a trained assistant.

Patients do experience unpleasant effects at times from the use of nitrous oxid and oxygen; headache, general weakness, and nausea many times, in longer operations particularly. In all operations which are to consume more than a few minutes of time, I should advise preparation of the patient as for a major anesthesia, and by so doing much embarrassment may be saved to all concerned. I have prepared a clinical statement based upon 1200 consecutive administrations of nitrous oxid and oxygen, as follows:

Total cases—nasal method, 1200.

Estimated average duration of anesthesia, 10 minutes, the duration of the anesthesia in individual cases being from 3 to 50 minutes.

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Ages of patients, from 3 to 85 years.

Nausea during or after anesthesia, 20 per cent.

Hysteria after anesthesia, 4 per cent.

Patients difficult to control under the anesthetic, due either to non-susceptibility to nitrous oxid or extreme susceptibility to both gases, 7 per cent.

Bad breathers, 4 per cent.

Heart involvement during anesthesia (syncope), 3 in 1200 cases.

Spasm of glottis, 1 in 1200 cases.

Dr. Hertz seems to have dealt with the problem most satisfactorily. His answer to question No. 2, concerning the perfection of equipment, does not altogether agree with my experience, since up to the present time I have been unable to find a fixed point for any patient at which either analgesia or anesthesia may be evenly maintained; in other words, that point will not *stay* fixed. We may have an approximate point, but owing to variable outside influences this point will vary, and only by constant care and attention can this variation be followed so that the patient's condition will remain even.

Much is still to be desired in the way of perfection of apparatus, although the machines are being improved from year to year. The perfect machine should be capable of delivering the gases under the most accurate adjustment as to volume and pressure, and the mechanism necessary to accomplish this result should be of the simplest description.

It is apparent that, in order to obtain the best result, a fine adjustment of the mixture is necessary, also very close observation of the patient during the operation. The important point to be considered is that in all mouth operations, whenever the gases are administered nasally, a variable factor is introduced, namely, the amount of air entering the lungs through the mouth, which may or may not be excluded, depending upon one's technique. There is always more or less manipulation of the cheeks, tongue, and fauces, but in many cases the admission of air is reduced to the minimum, in anesthesia, by packing the pharynx with gauze; in analgesia, however, this packing might not be tolerated, and the varying pressure at the mouth must be met by changing the proportion of the mixture and readjusting the pressure, which cannot easily be done by the operator unless a skilled assistant be present.

One's success with this method is going to vary considerably, depending upon several factors, the most important of which are the condition of the patient, both mental and physical, control of the patient by the operator—and here we might mention his psychic or suggestive influence—and finally, perfection of one's technique in administering the anesthetic.

Dr. W. D. TRACY, New York. In these times of transition and rapid development a report such as the one submitted by our Correspondent is of inestimable value.

The subject with which it deals seems to be paramount in the dental mind throughout the country, and the facts concerning the use and advantage of analgesia, coupled with a statement of the disadvantages and dangers connected with the administration of nitrous oxid and oxygen, will be of great help to many who are endeavoring to decide in their own minds the true status of analgesia in its present stage of development.

The numbered questions propounded by the Correspondent have been so splendidly answered by so many men of

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high scientific achievement that I will not attempt to discuss them further. The word of caution as found in the letter over the signature of Dr. Gillett is worthy of emphasis, and I trust that the warning will not be unheeded by those who are tempted to jump into a field of work for which so few general practitioners are qualified by experience or education.

Dr. Prentiss has asked me to say something from the viewpoint of the general practitioner concerning the danger of too deep cutting or possible injury to the dental pulp during cavity preparation under analgesia. It is my opinion that before analgesia is begun, a careful diagnosis of the general condition of the individual tooth and those adjacent to it should be made. If there is any element of doubt concerning the condition of the pulp or of the pericemental membrane, the usual methods of reaching a definite conclusion should be used prior to the administration of the nitrous oxid. From my own experience and observation there seems to be no more danger of unintentional exposure of a dental pulp under analgesia than there is without it, when the work is being done by the hand of a careful operator who understands dental anatomy and pays heed to his knowledge of that important factor. It is my belief that dentin is even more sensitive where it joins the enamel than it is oftentimes in the deeper portion of a cavity, and with the present-day apparatus of the best type, which secures and maintains a definite mixture of the gases used, there is no need for undue haste in removing deep-seated carious portions of dentin. If the removal of carious dentin leads to actual exposure of the pulp, as it must in many instances, no matter whether analgesia is used or not, the patient who is in an analgesic state is in an excellent condition for the application of pressure anesthesia. As soon as the application of novocain under pressure has been completed, the inhaler is removed and the work is thus effected with a minimum of discomfort to the patient. If, in certain cases, the patient's sensation of pain is desired by the operator as a help in diagnosing conditions during the progress of his work, a slight analgesia will permit him to have the intelligent co-operation of his patient, and at the same time will securely protect the patient from that kind of pain which is declared by some to be "simply unbearable;" but such conditions do not often prevail in my own work.

While we cannot work under any fixed rule, it seems to me the general principle under which we proceed in preparing cavities is simply to lay our cavity margins in areas of immunity, gaining proper resistance from an adequate retentive form and the necessary removal of carious dentin. I do not see why the use of analgesia should in any sense interfere with an intelligent diagnosis of all these requirements, and in many instances analgesia is of great assistance in permitting the operator to proceed, not in the direction of least resistance, which would lead to an improperly prepared cavity because of his desire to spare the patient, but analgesia enables him to make a perfect operation.

I wish to revert a moment to Dr. Gillett's comment that "The present interest in the practice is largely commercial." This we acknowledge to be true, but it is true only because the dental profession has made it possible.

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Dentists for years have threaded their way through a maze of obtundents seeking to find some panacea for sensitive dentin, and now we are lost in the labyrinth of analgesia, anesthesia, conductive anesthesia, etc. There is an insistent demand on the part of the public, and a persistent desire on the part of the dental profession, that the pain necessarily incident to the performance of dental operations be reduced to a minimum, and if possible altogether eliminated. Analgesia has been a step in this direction, but admittedly falls far short of the desideratum, for the many reasons mentioned in this report. But until something better is presented, many operators will continue to find help from its use. There is, however, some light on the horizon; it may be that local and conductive anesthesia, produced by the injection of novocain, will be the next step in advance, though no man can come forward to say that this method is not beset with great drawbacks and grave dangers.

As far as the outlay of money for new and untried appliances and the building-up of a junk-heap is concerned, I freely charge such money to the cost of my education and advancement, and have just ordered a complete outfit of local anesthesia instruments and accessories. We must try the new ideas that are presented to us in order to prove or disprove the merits that are claimed for them.

Dr. HENRY W. GILLETT, New York. I would like to say a word or two in addition to what was said in the report. After I had sent my letter to Dr. Prentiss, as read by Dr. Hasbrouck, I had a talk with Dr. Thomas Bennett of New York, who is, if not the leading, one of the leading specialists in anesthesia in New York City. Following this conversation, I sent him a copy of the letter Dr. Hasbrouck read to you, and later called him up and asked for his opinion concerning it. He indorsed the letter with enthusiasm, saying that he felt it was an excellent statement of the situation. In talking with him I gained some further impressions of his own viewpoint, as, for instance, that he considers nitrous oxid and oxygen one of the most dangerous anesthetics in use. After an observation of four hundred cases, he has limited his use of it to a small and carefully selected class of cases.

In the May 1914 issue of the *Dental Cosmos* there appeared in the Review of Current Literature, on page 628, a review of an article by Dr. A. H. Miller on "Gas-Oxygen Anesthesia," in which the writer calls attention to a number of contra-indications to nitrous oxid and oxygen. There is also included in this article a list of deaths ascribed by the compilers of the list to nitrous oxid and oxygen anesthesia, as follows: Teter, 21; Crile, 2; Lydston, 3; Allen, 29; Gatch, 15; Olow, 6; Boys, 7; Miller, 8; Flagg, 9; Salzer, 11; Collins, 12; Buchanan, 13. I think that is sufficient comment concerning the safety of nitrous oxid and oxygen anesthesia and analgesia apparatus.

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3d	W. B. Hurd	Brooklyn	June 29, 1871
4th	C. A. Marvin	Brooklyn	June 27, 1872
5th	J. G. Ambler	New York	June 26, 1873
6th	W. C. Barrett	Warsaw	June 25, 1874
7th	W. C. Barrett	Warsaw	July 1, 1875
8th	C. A. Marvin	Brooklyn	July 13, 1876
9th	L. F. Harvey	Buffalo	May 10, 1877
10th	A. M. Holmes	Morrisville	May 9, 1878
11th	C. E. Francis	New York	May 14, 1879
12th	O. E. Hill	Brooklyn	May 13, 1880
13th	O. E. Hill	Brooklyn	May 12, 1881
14th	L. S. Straw	Newburgh	May 9, 1882
15th	L. S. Straw	Newburgh	May 10, 1883
16th	L. S. Straw	Newburgh	May 14, 1884
17th	F. B. Darby	Elmira	May 15, 1885
18th	N. W. Kingsley	New York	May 13, 1886
19th	N. W. Kingsley	New York	May 11, 1887
20th	J. E. Line	Rochester	May 9, 1888
21st	E. D. Downs	Owego	May 7, 1889
22d	W. W. Walker	New York	May 14, 1890
23d	W. W. Walker	New York	May 13, 1891
24th	W. W. Walker	New York	May 12, 1892
25th	F. L. Van Woert	Brooklyn	May 10, 1893
26th	F. L. Van Woert	Brooklyn	May 10, 1894
27th	H. J. Burkhart	Batavia	May 9, 1895
28th	H. J. Burkhart	Batavia	May 14, 1896
29th	H. J. Burkhart	Batavia	May 13, 1897
30th	F. Le Grand Ames	Albany	May 12, 1898
31st	F. Le Grand Ames	Albany	May 11, 1899
32d	J. I. Hart	New York	May 9, 1900
33d	J. I. Hart	New York	May 10, 1901
34th	R. H. Hofheinz	Rochester	May 15, 1902
35th	R. H. Hofheinz	Rochester	May 14, 1903
36th	W. Jarvie	Brooklyn	May 13, 1904
37th	W. J. Turner	Brooklyn	May 12, 1905
38th	W. A. White	Phelps	May 11, 1906
39th	W. S. Rose	Schenectady	May 10, 1907
40th	L. Meisburger	Buffalo	May 8, 1908
41st	B. C. Nash	New York	May 9, 1909
42d	A. R. Cooke	Syracuse	May 10, 1910
43d	Ellison Hillyer	Brooklyn	May 5, 1911
44th	Charles F. Baylis	Oneonta	May 10, 1912
45th	Wm. W. Smith	Rochester	May 9, 1913
46th	Albert M. Wright	Troy	May 14, 1914

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CONTENTS.

	PAGE
Address of the President	56
Committees	168
Dental Examiners	168
Essays and Discussions—	
"Municipal Control of Dental Clinics." By JOHN J. CRONIN, M.D.	75
"The Selection of Filling Materials for the Different Classes of Cavities." By C. N. JOHNSON, M.A., L.D.S., D.D.S.	87
"Studies of Internal Secretions in Their Relation to the Development and Condition of the Teeth." By Prof. WM. J. GIES	105
"The Technique and Relative Value of Gold Fillings and Inlays." By J. V. CONZETT	143
Executive Council, membership of	168
Fellows	170
Members, honorary	170
Officers, election of	12
" etc., for 1914-15	168
Past Presidents	171
Presentation of Fellowship medal	7
Report—Committee on Arrangements	22
" Committee on By-laws	23
" Committee on Clinics	22
" Committee on State Institutions	25
" Committee on Ethics	23
" Committee on Fellowship	22
" Committee on Law	16
" Committee on Legislation	24
Report—Committee on Necrology	29
" Committee on Oral Hygiene	33
" Committee on President's Address	21
" Committee on Practice	62
" Committee on Publication	23
" Committee on Scientific Research	24, 101
" Committee on State Library	25
" Committee on Trained Nurses	23
" Committee (Special Legislative)	27
" Correspondent	157
" Delegate to National Convention	30
" Executive Council	10
" Secretary	13
" Treasurer	15
Reports from District Societies—	
First District	37
Second District	41
Third District	44
Fourth District	45
Fifth District	47
Sixth District	48
Seventh District	49
Eighth District	52
Ninth District	54
Sessions—First Day, Afternoon	3
" " Evening	7
Second Day, Afternoon	8
" " Evening	9

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TRANSACTIONS

OF THE

DENTAL SOCIETY

OF THE

STATE OF NEW YORK

FORTY-SEVENTH ANNUAL MEETING

HELD AT

ALBANY, N. Y., MAY 1915

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TRANSACTIONS

OF THE

Dental Society of the State of New York.

FORTY-SEVENTH ANNUAL MEETING.

FIRST DAY—Afternoon Session.

THE forty-seventh annual meeting of the Dental Society of the State of New York was opened on Thursday afternoon, May 13, 1915, in the assembly room of the Educational Building, Albany, N. Y.

The president, Dr. A. M. Wright, Troy, called the meeting to order at 2 P. M.

The Rev. Dr. FRANK M. BLESSING, Albany, invoked divine blessings on the deliberations of the society.

Address of Welcome.

By the COMMISSIONER OF EDUCATION.

Dr. Wright then introduced to the society JOHN H. FINLEY, A.B., A.M., LL.D., commissioner of education of the State of New York, who delivered the welcoming address to the society, as follows:

Mr. President and gentlemen of the State Dental Society,—I have been asked to say a welcoming word, and I have accepted not only because we of this university have a concern for the standards and service of this profession, but also because we are beginning to appreciate your part in contributing to the effectiveness of the school.

IMPORTANCE OF DENTISTRY IN THE PRESERVATION OF HEALTH.

I have asked our newly appointed state medical inspector, Dr. William A. Howe, under whom the medical inspection of all the children in the schools of the state is carried on, to aid me in expression of this appreciation. These are some specific facts which he has furnished in response:

There are 4632 dentists in New York State. Next to the physicians, the dentists form the largest and most influential organization of conservators of the health of the public in the state. Like the physicians, the dentists are doing an enormous amount of gratuitous work, and are always found willing to do still more. Only during the past few years has the real value of a good dental

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equipment and a clean mouth been fully appreciated.

In our leading hospitals it is becoming more and more mandatory that every patient, before undergoing a serious surgical operation, shall first be subjected to a careful cleaning of the mouth and repair of defective teeth.

In our great institutions where tuberculosis is being so successfully treated, the dental dispensary is today recognized as an indispensable factor in the care of the tuberculous patient.

In several cities of the state, the number of which is steadily increasing, dental dispensaries are being operated, either associated with or independent of our union school system.

The medical inspection law administered under the direction of the Education department hopes and expects to do much both in preventive and corrective educational work in the care of the teeth. For a time it is to be expected that much volunteer work will necessarily have to be done by local dentists, until the various municipalities can be brought to realize the importance of this feature of educational work. It will be the aim of the department to enlist the co-operation of the dental profession of the state in this campaign for cleaner mouths, better teeth, and better health for the school child.

It would seem as if, through the dental profession, a most successful system of education of parent, teacher, and child could and should be conducted.

To insure good health it is highly essential that we begin at the gateway of the body, making certain that this avenue is clean and properly equipped for its important functions. Our educational institutions should be more extensively utilized in extending the propaganda of clean mouths and good teeth.

What Dr. Howe has said I would repeat without quotation marks as expressing the basis for my welcome to you who represent that profession.

But I wish to welcome you as those who work with the Creator to make some of his laws operate to counteract others.

I think of this university as a physical and spiritual agency for helping the Almighty to conserve what he has created. And I wish to think of you not as men engaged in commercial, gainful enterprise, but as an association, a brotherhood, as Professor Palmer put it not long ago in this very room, to make a more comfortable and more beautiful human world. For I think of your mission as not merely that of relieving pain and improving machinery, but of making faces more beautiful.

I have been reading recently a satire on our English civilization—a description of a land where, in the desire to develop a sound and beautiful race, individuals who are physically ill are treated as we treat the criminal. One chapter describes the trial of a person for pulmonary consumption. Toothache would undoubtedly there be considered as a misdemeanor, punishable by fine or imprisonment unless the individual could correct his offense. This seems all very absurd, but think of how the pain and ugliness and inefficiency could be reduced, if only we could be as insistent upon as high a degree of physical as of moral hygiene.

Again I give you most cordial welcome, and I hope that our hospitality may act as an anesthetic that will make you insensible of any pain or discomfort while under our roof.

The next order of business was the reading of the annual address by the president, Dr. A. M. WRIGHT, Troy. [See pages 55 to 61.]

The Chairman appointed the following as the Committee on the Address of the President: Drs. L. Meisburger; A. W. Twiggar; F. F. Hawkins;—who returned the following report:

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Report of Committee on President's Address.

ALBANY, N. Y., May 14, 1915.

TO THE COUNCIL:

Gentlemen,—The Committee on President's Address respectfully presents for your consideration the attached report:

Your committee desires to congratulate the association upon the able character of the President's address. It exhibits a watchful interest in the welfare of this society and the profession generally.

We respectfully report the following recommendations:

(1) We recommend that the suggestion of the president for the celebration of the golden anniversary be approved and that the Executive Council be requested to appoint a committee to carry out the recommendation.

(2) The committee have complied with the president's recommendation for the early publication of the State Society proceedings in the dental journals, and have conferred with the Executive Council.

(3) Your committee recommend that in the future, if a bill is introduced into the legislature by this society, as soon as it is printed a copy be mailed to the president and each member of the executive committees of the district societies.

(4) We suggest that in the future, as a means of efficiency, the president forward to the Committee on President's Address a copy of the recommendation he contemplates presenting. This would enable such committee to give this matter more mature and deliberate thought.

LOUIS MEISBURGER, *Chairman*,
F. F. HAWKINS,
ALBERT W. TWIGGAR,
Committee.

The next order of business was the reading of the Report of the Correspondent, by Dr. L. M. WAUGH. [See pages 62 to 80.]

The next order of business was the report of the Committee on Practice, by Dr. D. H. SQUIRE, chairman, Buffalo. [See pages 81 to 93.]

The meeting then adjourned until 8 P.M.

FIRST DAY—Evening Session.

The meeting was called to order Thursday evening, May 13th, at 8 o'clock, by the president, Dr. Wright.

The President read a letter from Dr. R. W. Bunting, Ann Arbor, Mich., expressing his regrets at being unable to attend the meeting and to take part in the discussion of Dr. Hopewell-Smith's paper.

The President announced as the first item on the program for the evening session the reading of a paper by Professor A. HOPEWELL-SMITH, Philadelphia, Pa., entitled "Concerning the Production of Dental Caries." [See pages 94 to 101.]

The President announced as the next order of the program, the reading of a paper by Dr. W. A. Capon, Philadelphia, Pa., entitled "Some Advantages of Jacket Crowns." [See pages 110 to 125.]

The meeting then adjourned until the Friday afternoon session.

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SECOND DAY—Afternoon Session.

The meeting was called to order on Friday afternoon, May 14th, at 2 o'clock, by the president, Dr. Wright.

The first item on the program was the reading of a paper by Dr. CLARENCE J. GRIEVES, Baltimore, Md., entitled "The Relation of the Vitality of the Periapical Cementum and Adjacent Tissues to the Patient's Health and the Status of the Dental Profession." [See pages 126 to 158.]

The next order of business was the report of the chairman of the Research Committee, Dr. W. B. DUNNING. [See pages 159, 160.]

Dr. W. B. DUNNING, introducing Dr. Gies, said:

Mr. President and gentlemen,—To introduce our old friend and honored member, Professor Gies, would be a superfluous act. I wish to take, however, a few minutes to explain the nature of the work during the past year. In June of last year Professor Gies wrote to your chairman outlining a somewhat elaborate scheme of work for the year which would involve an expenditure of about $1500. This involved a large amount of histological work by experts, the purchase and maintenance of a considerable number of animals, etc. The money appropriated at the time consisted of five hundred dollars from our association, and a contribution of five hundred from the National Research Commission to aid us in that work, making a total of one thousand dollars for the year's work. Under the circumstances it was impossible for Professor Gies to carry out the original program, and he decided, and the committee concurred in the decision, that it would be wiser to recast that program on a smaller scale and along lines preparatory to the work in hand. The work, therefore, that he has been doing during the past year has been of a preparatory nature toward a larger program in the coming year, and through the very generous aid and co-operation on the part of Columbia University we have been able to save half of our appropriation of last year toward the next year's budget in the hope that the appropriations we had last year may be duplicated this year, and with the money still in hand we hope to undertake a program which will require eleven months' continuous work, beginning in June.

With this brief outline of the situation, I take pleasure in introducing Professor Gies.

Dr. GIES then presented his report, entitled "Studies of Internal Secretions in Their Relation to the Development and Condition of the Teeth," also "Studies of the Influence of Unbalanced Diets on Dentition." [See pages 161 to 228.]

The meeting then adjourned until the evening session.

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SECOND DAY—Evening Session.

The meeting was called to order on Friday evening at 8 o'clock, by the president, Dr. Wright.

The President read a telegram from Dr. John Rogers, expressing his regrets at being unable to attend the meeting and take part in the discussion of Dr. Gies' paper.

Report of Fellowship Committee.

The next order of business was the report of the Fellowship Committee, Dr. W. J. TURNER, chairman, as follows:

TO THE COUNCIL:

The Fellowship Committee beg to report that they unanimously recommend that Dr. Charles N. Johnson of Chicago be elected a Fellow of the Dental Society of the State of New York, and that in recognition thereof, the Fellowship medal be presented to him.

Respectfully submitted:

W. J. TURNER, *Chairman*,
RUD. H. HOFHEINZ,
A. R. COOKE,
L. MEISBURGER.

Dr. WRIGHT then presented the Fellowship medal to Dr. Johnson, addressing him as follows:

Dr. Johnson,—I wish to extend to you my most sincere congratulations. There are many pleasures in connection with presiding over this body, but the greatest pleasure of all is the privilege of standing here and in the name of the Dental Society of New York presenting to you the well-earned Jarvie Fellowship medal. And here I would like to congratulate the committee upon the selection of one so worthy of the honor. Could I obtain the voice of our entire membership, I assure you there would not be one dissenting voice.

It is customary on occasions of this kind for the presiding officer to present a somewhat lengthy, studied, elaborate address, dwelling upon the life, the character, the marked ability and integrity of the recipient, lauding his upright manly conduct as a citizen, his kind and tender care as a father and his ever-loving, moral, and virtuous life as a husband, until I wonder sometimes if the recipient of the honor realizes who is being talked about. And I assure you, were his wife and family present, I would not be surprised to see them shed tears of joy over the newly discovered evidence of the greatness and purity of the one so dear to them. I have written an address along the usual lines, but, Dr. Johnson, your innate modesty appeals to me, and I have decided to spare your blushes and tell you a story.

This is an old, old story. I heard it myself nearly thirty years ago, and the man then relating it said he was almost ashamed to tell it because it was so old, but I assure you, gentlemen, it is suitable for the occasion. Those of you who have heard it many times are at liberty to read your evening paper.

Go with me back to one of the early centuries, in one of the far-eastern countries noted for its many magnificent temples filled with wonderful carvings. A new temple was being erected; it was nearly completed, and the workmen were engaged in carving the capitals and the arches. An old man applied for work, but it was refused him; he applied again and again, until finally the master workman took him around to the rear of the temple, and there, on a scaffold, set him

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to carving one of the arches. The old man was faithful in his work. Every day from sunrise to sunset, the sound of his chisel and mallet resounded through the corridor of the temple. One night, as the workmen were starting for their homes, it was noticed that the old man was missing. Someone ascended the ladder and there on the scaffold found the old man dead—his work was finished; he had died at his post. Upon that arch he had carved the beautiful figure of an angel. The face was that of his only child, a daughter who had died just as she was budding into womanhood. It was all the old man had left to love, and life held no charms to keep him. Every curve, every line of that figure, every feature of that face was perfect in every detail; it was a masterpiece.

Years passed. It was found one morning that, when the sun reached her utmost northern meridian, as she rose over the eastern hills, the full splendor of her rays burst through a stained glass window, falling directly upon the figure of the sleeping angel, showing a halo of glory around that face, which transformed the inanimate into almost animate, living, speaking life. It was a marvelous transformation. As long as that temple stood, thousands came on that mystic morning to behold and worship at the shrine of the sleeping angel. The old man had "builded better than he knew," and "his works did follow him."

So, gentlemen, with Dr. Johnson. For years we, the older men in the profession, have heard the sound of his chisel and mallet resounding through the corridors of the dental world, ever carving deeper and deeper into the unknown, trying to throw the true light upon some unsolved problem the solving of which will benefit all mankind. It has not always been smooth sailing with Dr. Johnson. Today the waters lie smooth and his barque is guided easily, but he has been tossed here, there and yonder by the waves of adversity, and it has only been by the utmost willpower, pluck, and perseverance that he has finally emerged victoriously. He has carved his name across the face of old Father Time, where it will remain bright and clear, sparkling as a star which shines from above, where it will remain indelible as long as the word dentistry remains; where it will remain respected, honored, and loved, as long as there remains one respected and honored dentist to love his chosen profession.

Gentlemen, Dr. Johnson has builded better than he knew, and his work will follow him.

Dr. Johnson, in the name of the Dental Society of the State of New York I present to you the jewel that constitutes you a Fellow of this society. Take it, keep it; I know that you can do so with honor to yourself, and in doing so you honor the society which presents it.

Gentlemen, allow me to present to you Dr. C. N. Johnson of Chicago, the newly elected Fellow of the Dental Society of the State of New York. (Applause.)

Dr. Johnson, in accepting the medal, said:

Mr. President and fellow members of the Dental Society of the State of New York,—I am very grateful to the president for not having delivered his formal address, because if it had been of the character intimated by him, I can assure you that I would not have recognized myself.

I am very much impressed with that

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wonderful story he has told you, in which he has done me the honor to indicate in a very delightful way some of the things which he is pleased to intimate that I have done for the dental profession. I wish I could feel in my heart that I was entitled to the illustration of that character, but, sir, I would rather be known as a man who had tried to do a little here and there for the profession I love, and to accomplish something for the welfare of humanity in the service of that profession, than to be the most famous man on the face of the earth. My sentiments this evening are divided between unqualified gratitude and keen embarrassment. I am grateful to the members of this society for the honor they have shown me on this occasion, and I wish particularly at this time to express what I believe are the sentiments of the whole association, when I say that you and I are indebted to the distinguished gentleman who has been the means of giving to you and to me this particular pleasure. I wish it were possible for me to pay to Dr. Jarvie the tribute that he deserves. It is hard to do that in a formal way, because I have just been to dinner with him and do not care to be formal immediately after having dined so very delightfully with him, but I do want Dr. Jarvie to know that on this occasion I am grateful to him as well as to the members of this society.

My embarrassment is occasioned by the conviction of my unworthiness to accept this honor, and my only reason for presuming to permit myself the pleasure of receiving the medal is that, if I have not done anything in the past to merit it, I pledge you my word that I shall try to do something in the future for the welfare of dentistry that may make you feel as an organization that your confidence in me has not been altogether misplaced. I thank you. (Applause.)

The next item on the program was the reading of a paper by Dr. C. N. JOHNSON, Chicago, Ill., entitled "A Consideration of Some of the Present Tendencies in Dentistry." [See pages 229 to 243.]

The meeting then adjourned until Saturday morning.

THIRD DAY—Morning Session.

The meeting was called to order Saturday morning, May 15th, at 10 o'clock, by the president, Dr. Wright.

The first order of business for the morning session was the reading of the report of the Law Committee.

Dr. BEACH moved that the reading of the report of the Law Committee be dispensed with. (Motion carried.)

The next order of business was the reading of the report of Council, by the secretary of the Council, Dr. G. B. Beach.

Dr. BEACH moved that the report be adopted. (Motion carried.)

The next order of business was the installation of officers, after which Dr. A. P. Burkhart moved that the society adjourn to meet in Albany on the second Thursday in May 1916.

Motion carried, and the society then adjourned.

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MINUTES OF EXECUTIVE COUNCIL.

Special Meeting.

SYRACUSE, January 30, 1915.

A special meeting of the Executive Council of the New York State Dental Society was held in Syracuse, N. Y., January 30, 1915.

The members present were Drs. Rich, Canaday, Murray, Gould, Randall Wheeler, Hert, Beach. *Ex-officio members*—A. M. Wright and A. P. Burkhart.

Drs. Cooke, H. J. Burkhart, and Ottolengui appeared before the Council.

Dr. A. R. Cooke, chairman of the Special Legislative Committee, submitted a draft of a proposed new dental law. The report was received.

Assembly bill No. 151, introduced into the legislature by Mr. Boyd, was read and the Council disapproved of the bill.

Motion was carried that the Ninth District be notified of this disapproval, and that the district be informed that any dental legislation should be presented to the Executive Council of the State Society before its introduction to the legislature.

The bill submitted by the Special Legislative Committee was discussed and its provisions as amended in the Council were approved. The proposed legislation was referred to the president of the Council and the chairman of the Legislative Committee, with instructions that it be presented for early introduction into the legislature, and to send a copy of the bill to the Regents.

Council adjourned.

G. B. BEACH.

Regular Meeting, at Albany.

ALBANY, May 12, 1915.

The report of the Secretary was received and filed. [See pages 14, 15.]

The Treasurer's Report was received and placed on file, the total cash balance of May 12, 1915, being $2910.84.

Minutes of the special meeting of the Executive Council of the New York State Dental Society, held in Syracuse on January 30, 1915, were read and approved.

The secretary of the Council was authorized to draft for the Council a note of sympathy to Dr. J. W. Canaday, extending to him our best wishes for a speedy recovery.

Dr. George Vanderpool, chairman of the Committee on Arrangements, reported. The report was received and filed.

Dr. J. N. Garlinghouse, chairman of the Committee on Ethics, reported. The report was received and filed.

Dr. Daniel H. Squire, as chairman of the Committee on Practice, reported. The report was received and referred to the society for its consideration. [See pages 81 to 93.]

The report of the Committee on Necrology, Dr. Wilbur S. Rose, chairman, was read and approved. Special mention was made of the deaths of Dr. A. M. Holmes, Dr. Ralph E. Luther, and Dr. J. Morgan Howe.

Dr. Gross, chairman of the Exhibit Committee, reported, showing a net amount collected of about $680. Report was ordered filed.

The report of the Committee on Legislation, Dr. George Vanderpool, chairman, was received and filed.

Dr. Dunning reported for the Committee on Scientific Research. [See pages 159, 160.] The report was received. Motion was made that the Council express its appreciation to Columbia University through Professor Gies of the very hearty co-operation that has been extended to us in this scientific work. The thanks of the society are extended to the committee.

The report of the Committee on Oral Hygiene was referred to the society.

Dr. W. G. Lewis, chairman of the Committee on Clinics, reported. The report was read and received.

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The report of the Committee on President's Address was referred to the society.

The report of the Committee on Registration, G. H. Butler, chairman, was read and filed. A motion was made and carried that the secretary of the society be instructed to ask Dr. Butler, chairman of the Committee on Registration, to require all guests to be vouched for, and that the names of the persons so vouching appear upon the registration book. All trade and exhibit men to register as such, specifying whom they represent.

Dr. Horace Gould, chairman of the Committee on Liability Insurance and Attorney, reported. The report was laid on the table. Dr. Dyer appeared and was heard with regard to the matter of counsel and liability insurance.

Dr. Gould, chairman of the Committee on Amendments to By-laws, reported. The amendments proposed last year were adopted as read. These amendments relate to correction of errors and practically unimportant features of business transaction.

Dr. A. W. Twiggar reported for the Committee on Dental Service in State Institutions. The report was received and filed, and the committee was continued.

A motion was made and carried to adopt the following resolutions amending the By-laws:

Resolution introduced that Section 18 of the By-laws be amended by changing the title of the Committee on By-laws to read "Auditing Committee" and that references in other sections of the By-laws be made to conform therewith.

Resolution made that Section 5, page 21 of the By-laws, be changed to read as follows: "Any person may be elected to honorary membership except dentists from New York State. Honorary members shall be elected by the Executive Council, after having been duly proposed."

It was carried that the New York State Dental Society send a representative to attend the fiftieth annual meeting of the Ohio State Dental Society, at which time the Miller Memorial will be unveiled. The meeting will be held at Columbus, Ohio, December 7, 8 and 9, 1915. The president is designated to represent the society or appoint a representative, the expense to be paid by the person attending.

A recommendation was made that the state law be amended permitting a graduate from a dental college recognized by the State Board of Regents to practice without a license in a public institution from the time of such graduation until the first dental examination thereafter shall be held and he can learn the results. The recommendation was referred to the Committee on Pending Legislation.

A communication from the Utah State Dental Society was read and referred to the society to be read. The secretary was instructed to express the appreciation of our society for the invitations and courtesies extended.

A motion was made by Dr. A. P. Burkhart that the recommendation of the Oral Hygiene Committee be granted, and that the committee be permitted to prepare a film at a cost of $100, the same to be loaned for use at the Panama Exposition.

A motion was carried that the secretary be permitted to bring the matter of the coupons issued by the American Institute of Dental Teachers to raise money for funds to be given to the European Red Cross dental hospitals to the attention of the main session.

A motion was made that the State Committee of the Scientific Foundation and Research Committee should present blank pledges before the society after the reading of Dr. Gies' paper.

A motion was made that when the card index of the Dental Index Bureau is received it be placed in the State Library.

The report of the New York State Committee of the Scientific Foundation and Research Committee was received and placed on file. The total amount subscribed and pledged in New York State during the past year amounted to $6886.

A motion was made by Dr. Hert that the following resolution with regard to Dr. Finley's address be adopted, and a copy of the letter be sent to Dr. Finley:

"The State Dental Society, in annual convention assembled, takes pleasure in extending to President John H. Finley of the University of the State of New York, its con-

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gratulations and appreciation of his earnest efforts to better conserve the health of the school child.

"It is particularly gratifying to the dental profession and to this society to find the Commission of Education so mindful of the inseparable relation existing between good health, a good dental equipment, and a clean mouth, and so willing to utilize the educational agencies of the state to popularize this essential feature of healthful living.

"We wish to assure President Finley of our earnest desire to co-operate in every possible manner, to the end that his most laudable ambition for better health for the child may be fully realized."

A motion was made and carried that the New York State Dental Society approve the plans as outlined by Dr. Howe of the state Educational department, and recommend the co-operation of the dentists in this state for examination of the teeth of the school children, and that the secretary inform the district societies of our action.

A motion was made by Dr. Hert, and carried, that the matter of empowering the secretary to enter into an agreement with the publishers of the *Allied Dental Journal* to publish the proceedings of the New York State Dental Society be referred back to the district societies to be discussed at their fall meetings, with instructions that when the results are received the secretary submit the same to the Executive Council, and the Executive Council before February 1st take action upon the proposition.

The following proposed amendment to the By-laws was made by Dr. Wheeler: Change Section 39 of the By-laws on page 31, where it now reads "Each district society shall annually pay into the treasury of the State Society the sum of $2.00 for each member on or before the 25th day of April of each year," to read "$4.00," and such other changes as are necessary to make the various articles in the By-laws conform to Section 39.

Mr. Purrington, counsel for the Law Committee, came before the Council and presented various phases of the Law Committee's work.

A resolution made by Dr. Rich regarding the Walker bill No. 1570 was adopted, and a copy of said resolution forwarded to the Governor, asking him to veto the Walker bill.

The recommendation of Dr. A. P. Burkhart that Garrett C. Daboll of Dansville, N. Y., be made an honorary member of the State Society was adopted.

Motion was carried that the communication from the Allied Dental Council be laid on the table.

Report of the Law Committee was received and referred to the Auditing Committee, and afterward to be read before the society.

A report of the Committee on President's Address was received and the recommendations were adopted.

A motion was made that the matter of the special committee with regard to the question of the fiftieth anniversary of the society be left in the hands of the chairman of the Executive Council.

The report of the Fellowship Committee awarding the medal to Dr. C. N. Johnson of Chicago was received, and referred to the general session.

The State Library Committee's report was received and placed on file. The report contains the names of the dental books that have been added to the library this year and the names of periodicals wished by the library.

The following proposed amendment was made to the By-laws: To amend subdivision 3 of Section 15 by striking out the words "in the afternoon" and "three o'clock."

Also change Section 32 of the By-laws to read as follows: "The society shall hold its annual meeting, commencing on the second Thursday of May in each year at 10 A.M., and such other special meetings as may be necessary. At each annual meeting before adjournment the Executive Council shall name the next place of meeting."

The report of the Special Legislative Committee, Dr. A. R. Cooke, chairman, was received and a motion made that the committee be discharged with the thanks of the Council.

Motion was made that the Executive Council receive the communication of the Second District relative to the Seelye bill.

Motion was made that the president of this society appoint a committee of three, of which the chairman of the Executive Council shall be a member, with power to take up the matter of dental legislation with the Regents and draft a bill as near as possible like the

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one adopted by the Council at Syracuse and to meet the requirements of the Regents.

Motion was made that the usual honorariums of $200 to the secretary and $100 to the treasurer be given.

A motion was made that the report of the Committee on Trained Dental Nurses be received and laid on the table.

A motion was made that the Scientific Research Committee of the New York State Dental Society be given $500 for its work for the ensuing year. [Carried.]

Motion made that the New York State Committee of the Committee on Foundation and Scientific Research be continued as now constituted, with the exception of the appointment of C. F. Baylis of Oneonta to fill the vacancy of Dr. Kelly, and Dr. Lewis H. Gilbert of Rochester to fill the vacancy of Dr. Goble.

The report of the Auditing Committee, Dr. C. A. Bradshaw, chairman, was received and placed on file.

A motion was made that a committee be appointed by the chairman to look into the matter of arranging a uniformity of law in regard to the professions of the state.

A motion was made that the secretary write to Dr. Crompton, expressing the appreciation of the New York State Dental Society for the work he is doing along the line of oral hygiene in the schools of New York city.

Resolution was adopted that the delegates present at the National Dental Convention in San Francisco be empowered to cast a ballot for the entire delegation.

The following delegates were elected to the National Dental Association:

Regular delegates—J. W. Canaday, Sr., Albany; W. W. Smith, Rochester; H. L. Wheeler, New York; Ellison Hillyer, Brooklyn; E. A. Smith, Rome.

Alternates—W. C. Deane, New York; A. P. Burkhart, Auburn; C. K. VanVleck, Hudson; F. C. Walker, Brooklyn; G. A. Potter, Cape Vincent.

ELECTION OF OFFICERS.

President—Stephen Palmer, Poughkeepsie.
Vice-president—Robert Murray, Buffalo.
Secretary—A. P. Burkhart, Auburn.
Treasurer—Geo. H. Butler, Syracuse.
Correspondent—L. M. Waugh, New York.

REPORTS OF OFFICERS AND COMMITTEES.

Report of the Secretary.

May 12, 1915.

TO THE COUNCIL:

Gentlemen,—I herewith present for your consideration my annual report. All recommendations and general instructions passed by the Executive Council of 1914, were duly taken care of in regular order.

The publishers of the *Dental Cosmos* printed and distributed the proceedings of 1914 to all members whose names appeared on the rolls of April 25, 1914, and in addition furnished an additional number of copies for future use.

As per instructions a contract was made with the publishers of the *Dental Cosmos* for the reporting, printing, and distribution of the proceedings of the present session of 1915.

Dr. L. P. Anthony will be present and report the general sessions of the society.

The preliminary circular, followed in due time by the official program, was mailed to all members within the state, to essayists, to the principal officers of all the state societies affiliated with the National Association, and to prominent members of the profession outside the state.

With a view of obtaining prompt and neatly prepared reports from the various committees, I prepared a special blank, which was placed in the hands of the chairmen of committees.

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A letter of instruction was also sent to each chairman.

The various reports from district societies, with their recommendations and the committee reports, will be presented in regular order as indicated in the preliminary circular. each of you having received said circular, no doubt.

The members elected to attend the National House of Delegates were present at the National Association meeting held at Rochester in July 1914. The terms of four delegates and their alternates expire at this session. An election to fill the vacancies and for a two-year term will be necessary at this session. The following are the regular delegates whose terms expire: E. A. Smith, H. L. Wheeler, J. W. Canaday and W. W. Smith, and the alternates G. A. Potter, W. C. Deane, C. K. VanVleck, and A. P. Burkhart.

On account of certain rules adopted by the National Dental Association, the secretary. Dr. Otto U. King, was compelled to exact an admission fee from all persons unaffiliated with any of the district societies of this state. To gain admission the applicant was required to execute an application for membership in the district in which he happened to reside. He deposited, for instance, $5 if a resident of the Seventh District Society. From this amount the National society retained $1 and in advance of knowing if the applicant would really be an acceptable person and be admitted by the Seventh District. Shortly after the close of the National meeting, I received nearly $400 from the National secretary, with a large number of applications, and was requested to send to each respective society the amount of money covering the applications. I was also supplied with membership certificates covering all the applications and requested to mail them to each applicant. I took it upon myself to keep the certificates in my desk, and they are still there. I did this because the applicants were not *bona fide* members and could not be until their eligibility was established by the respective societies. I did, however, forward the applications and money to the various district societies, and for several months thereafter a very animated correspondence arose between certain district societies and the National secretary. The National secretary was not at fault; he simply obeyed orders. I am pleased to state that matters were finally adjusted by asking the applicants to make regular and new applications. Many did apply and were admitted, and those who failed had their money returned less the $1 retained by the National Association.

I trust at future meetings of the National Association there will not be a repetition of the course pursued at Rochester.

I have requested Dr. Rich to give a general synopsis of the National meeting held at Rochester, and I presume he will do so.

My expenses as per bill attached from May 1914 to May 1915 amounted to $71.80.

I tender my sincere thanks to the president of the society, in fact to all state officers, members of committees and members generally with whom I have had correspondence or business relations, for the very courteous treatment shown me.

Respectfully submitted,

A. P. BURKHART, *Sec'y.*

Report of the Treasurer.

ALBANY, N. Y., May 11, 1915.

TO THE COUNCIL:

Gentlemen,—The treasurer respectfully presents for your consideration the attached report. The late arrival of some of the reports from the district societies prevents a typewritten report, which would be more legible.

Fund "B" is depleted, and we owe Mr. Purrington $10.30 on his April bill; but we have paid this year $775 to Sparks & Fuller to balance an old bill, and $425 to the Eastern Dental Association, so that department of the society is better off than a year ago.

The dues to the National Dental Association this year will be $1415.

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"A" SOCIETY FUND.

Receipts.

Balance from 1914	$3587.61
Exhibit Committee	585.59
Additional 1914 dues	18.00
Interest on deposits	62.98
First District dues	866.00
Second " "	516.00
Fifth " "	180.00
Sixth " "	163.00
Seventh " "	256.00
Eighth " "	380.00
Ninth " "	140.00
Fourth " "	176.00
Third " "	156.00
	$7087.18

Disbursements.

Expenses of committee members	$185.21
Expense essayists from abroad	326.47
Overpaid dues returned	4.00
Secretary's expenses	69.94
Treasurer's expenses	4.61
" bond	17.50
Secretary's honorarium	200.00
Treasurer's "	100.00
Dr. J. W. Gies' "	35.00
Stenography and typewriting	109.52
Hotel Ten Eyck	24.60
Badges	56.00
Printing and stationery	654.31
S. S. White Dental Mfg. Co.	107.68
Bulletin board	20.50
Framing pictures	16.00
Oral Hygiene Committee	500.00
Committee Scientific Research	500.00
National Association dues	1300.00
Cash balance	2855.84
	$7087.13

"B" LAW FUND.

Receipts.

Balance 1914	$15.51
From First District	1315.00
" Second "	575.00
" Seventh "	50.00
Educational Department	1624.13
	$3579.64

Disbursements.

Expenses of First District	$2279.64
" " Second " (balance bill Sparks & Fuller)	775.00
Expenses Seventh District	100.00
Eastern Dental Association	425.00
	$3579.64

"C" JARVIE MEDAL FUND.

Credits.

Balance from 1914	$5.00
From Erie R. R. Bond	40.00
" N. Y. City Bond	10.00
1 Erie R. R. Gold bond	1000.00
1 N. Y. City bond	250.00
	$1305.00

Debits.

Bonds	$1250.00
Cash balance	55.00
	$1305.00

RECAPITULATION.

Receipts.

Total balance from 1914	$3608.12
Society Fund (A)	3499.57
Law " (B)	3564.13
Jarvie " (C)	50.00
	$10,721.82

Disbursements.

Society expenses 1914–15	$4231.34
Legal expenses	3579.64
Total balance	2910.84
	$10,721.82

Examined and found correct:

C. A. BRADSHAW,
L. A. TIMERMAN,
C. C. BACHMAN, *By-laws Committee.*

Report of the Law Committee.

May 10, 1915.

TO THE DENTAL SOCIETY OF THE STATE OF NEW YORK:

Mr. President and Gentlemen,—The Law Committee of the Dental Society of the State of New York herewith respectfully submits its report from May 1, 1914, to May 10, 1915.

Your committee organized immediately after its election, appointing Dr. Wm. Carr chairman, and retaining Wm. A. Purrington, Esq., as counsel for the society.

Owing to the many complications arising through the prosecution of the law, the report of the committee will be that of your counsel, Mr. Purrington, as he has tried these cases and they are a matter of record.

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Report of Counsel.

DR. WM. CARR, Chairman Law Committee.

Dear Sir,—I submit a report of the State Dental Society's legal matters so far as they have been under my supervision since May 1, 1914.

The usual tables annexed show the status of cases prosecuted under the dental law so far as I have been advised of them.

City warrants for fines have been sent to you in the following amounts:

(*A*) For cases initiated and prosecuted by the society	$1590
(*B*) For cases initiated and prosecuted by the district attorney of the Bronx	$300
(*C*) For cases initiated and prosecuted by the Allied Dental Council	100
Total	$1990

The fines outstanding are

(*A*) In the State Society's cases	$185	
(*B*) Cases of the Allied Dental Council	350	
		$535

Total amount of fines paid and payable to the society $2525

Prepared by W. A. Purrington, Counsel.

ANNEX "A."

(*a*) Cases in which warrants have been issued wherein it has not been possible to bring the accused to trial.

NAME.	COUNTY.	DATE OF WARRANT.	REMARKS.
Hunter, C. F.	New York	Nov. 25, 1902	Fugitive.
Cook, William R.	"	" 8, 1893	"
Adams, C. O.	"	" 12, 1897	"
Mitchell, Ormsby	"	Feb. 21, 1898	"
King, Archibald	Kings	Apr. 25, 1899	"
Randell, Maurice (1)	New York	May 4, 1900	"
Seeley, Richard	"	Dec. 6, 1902	"
Levy, Mark	Kings	" 6, "	"
Packard, Frank D.	"	Jan. 26, 1904	"
Hackett, Alice (2)	New York	May 10, "	"
Meade, Richard	"	Apr. 7, "	"
Maloney, John	"	Sept. 8, "	"
Dolan, John	"	Nov. 27, 1905	"
Haganour, Henry	Oneida	Sept. 24, 1907	"
Rubenstein, Louis	Kings	July 10, "	"
Marbo, Louis	"	June 26, 1908	"
Yueck, Woo Wun	New York	Feb. 15, 1909	Warrant unexecuted.
Hocking, T. B.	Kings	Oct. 2, 1911	Fugitive.
Nadelson, Harry	"	Aug. 11, 1914	Warrant unexecuted.
Davis, Walter T.	New York	Oct. 6, "	" "
McErlain, A. E.	"	Jan. 29, 1915	Fugitive.
Darling, Austin R.	"	Mar. 11, "	Warrant unexecuted.

(1) This man is reported to be dead.

(2) This woman's case had always been adjourned by the court on representations that she was too ill to be brought to trial.

Note 1.—"Fugitive" means one upon whom the police have failed to serve the warrant, presumably because the accused has fled the jurisdiction. Probably none of the defendants could be convicted now upon the evidence even if brought to trial. The names are carried from year to year for the sake of the record. One of them occasionally comes above the surface, as did one Joseph Feinstein (see last year's report) and D. Zacharopoulos (see *Note 2*, below).

Note 2.—The name of D. Zacharopoulos appeared on this list in last year's report, a warrant having been issued November 14, 1912. The accused could not be found and was reported to have left the city. Fresh evidence, furnished by an alleged actual patient, was procured, and the accused arrested June 12, 1914.

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ANNEX "A."—*Continued.*

(*b*) Cases pending on May 1, 1914, in which warrant was issued prior to that date, and the disposition, if any.

Griswold, Hector. At the date of last year's report, Griswold's appeal from the judgment of his conviction was pending in the Court of Appeals, which court on November 10, 1914, unanimously affirmed the conviction.

ANNEX "B."

Cases initiated since May 1, 1914.

NAME.	COUNTY.	DATE OF ARREST.	RESULT.
Bookstein, Chas.	Kings	May 4, 1914	Fined $75.
Pascher, Max	New York	June 3, "	" $100.
Zacharopoulos, Deny	"	" 12, "	Withdrawn.
Weintraub, Israel	"	July 30, "	Sentence suspended.
Blum, Manuel	Bronx	" 15, "	Discharged.
Josephson, Joseph	New York	" 30, "	Sentence suspended.
Davis, Walter T.	"		Fugitive.
Demirjian, Dick R.	"	Sept. 1, "	3 mos. and $200.
Martin, Leon	"	Dec. 14, "	Pending.
Kilmartin, Katherine	"	Sept. 19, "	Discharged.
Elliott, Max R.	"	Oct. 8, "	Fined $100.
Form, Max	"	" 23, "	" $75.
Lublinger, Joseph	"	" 23, "	" $100.
Alevis, D. N.	"	Nov. 4, "	" $100.
Schwartz, Leon J.	"	" 11, "	" $250.
Blumenfeld, Isaac	"	" 28, "	" $100.
Clothakis, Emanuel	"	Dec. 3, "	" $100.
McNamee, Frank	"	" 22, "	" $75.
Gecker, Mary	"	Jan. 14, 1915	Pending.
Schoenberg, Norbert	"	" 26, "	Discharged.
McErlain, A. E.	"	" 29, "	Fugitive.
Gray, Bennett	"	Mar. 2, "	Fined $100.
Cherry, Louis A.	"	" 2, "	Withdrawn.
Robinson, Leo H.	"	May 10, "	Pending.
Darling, Austin R.	"		Fugitive.
Sherwood, J. Nelson	"	Apr. 8, "	Pending.
Katz, William	"	" 12, "	Fined $50.
Longo, Michael	"	" 20, "	Pending.
Apfelbaum, Solomon	"	" 16, "	"
Romaine, George	"	" 30, "	"
Fischer, George	"	May 4, "	"
Weisenburn, C. J.	"		"
Deane, Carl S.	"		"

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ANNEX "C."

Result of Cases tried between 1914 and 1915.

NAME.	COUNTY.	FINE.	REMARKS.
Bookstein, Chas.	Kings	$75	
Zacharopoulos, Deny	New York	.....	Withdrawn.
Blum, Manuel	Bronx	.....	Discharged by magistrate.
Hackett, Clarence	New York	.....	Sentenced to 2 mos. jail.
Demirjian, Dick	"	200	3 mos. jail and $200 fine.
Pascher, Max	"	100	
Kilmartin, Katherine	"	.....	Discharged by magistrate.
Josephson, Joseph	"	.....	Sentence suspended.
Weintraub, Israel	"	.....	" "
Alevis, D. N.	"	100	
Blumenfeld, Isaac	"	100	
Lubliner, Joseph	"	100	
Clothakis, Emanuel	"	100	
McNamee, Frank	"	75	
Schoenberg, Norbert	"	.....	Discharged by magistrate.
Schwartz, Leon J.	"	250	Served out fine.
Form, Max	"	75	
Elliott, Max R.	"	100	
Cherry, Louis A.	"	.....	Withdrawn.
Katz, William	"	50	
Gray, Bennett	"	100	

ANNEX "D."

Table of Fines sent to the Society during the Year 1914–15.

(*a*) Cases tried through the office of W. A. Purrington, Esq.:

DeFeo, Eugenio (April 3, 1914)	$100
Zrake, William G. (April 30, 1914)	500
Bookstein, Chas. (August 12, 1914)	75
Pascher, Max (October 26, 1914)	100
Alevis, D. N. (Jan. 15, 1915)	100
Lubliner, Joseph (Dec. 27, 1914)	100
Blumenfeld, Isaac (Dec. 27, 1914)	100
Clothakis, Emanuel (Feb. 1, 1915)	100
Form, Max (Mar. 8, 1915)	75
McNamee, Frank (Feb. 1, 1915)	75
Scheld, William (Jan. 9, 1914)	165

(From instalments of Scheld's fine of $200 collected to date.)

Elliott, Max R. (March 4, 1915)	$100

(*b*) Cases tried through office of district attorney of Bronx county:

Lambert, Fred C. (Oct. 8, 1914)	$100
Diener, Anis (Oct. 8, 1914)	100
Ricke, Karl J. (Oct. 22, 1914)	100

(*c*) Case initiated by Allied Dental Council:

Mandelitis, John (March 26, 1915)	$100

ANNEX "E."

Fines imposed and outstanding.

(*a*) Fines imposed in cases tried by W. A. Purrington, Esq.:

Katz, William (May 5, 1915)	$50
Scheld, William (Jan. 9, 1915) (balance)	35
Gray, Bennett (May 10, 1915)	100

(*b*) Fines imposed in cases initiated by Allied Dental Council:

Gruher, Kalman (April 12, 1915)	$100
Kelner, Isadore (April 25, 1915)	250

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ANNEX "F."

Cases pending on May 10, 1915.

(*a*) Pending cases previously brought forward from past years, most of which are practically dead cases. (See Annex "A.")

(*b*) Cases in which warrants have been issued prior to May 10, 1915.

NAME.	COUNTY.	DATE OF ARREST.
Martin, Leon	New York	Dec. 14, 1914.
Gecker, Mary	"	Jan. 14, 1915.
Robinson, Leo H.	"	May 10, "
Sherwood, J. Nelson	"	Apr. 8, "
Longo, Michael	"	" 20, "
Apfelbaum, Solomon	"	" 16, "
Romaine, George	"	" 30, "
Fischer, George	"	May 4, "
Weisenburn, C. J.	"	
Dean, Carl S.	"	

(*c*) A number of investigations now in charge of the agent.

Receipts and Disbursements.

The receipts and disbursements from May 1, 1914 to May 10, 1915, are as follows:

City warrants forwarded to Dr. G. H. Butler, treasurer, for fines from May 1, 1914, to May 10, 1915.

May	19, 1914	$600.00	
Sept.	16, "	75.00	
Nov.	21, "	300.00	
Dec.	21, "	100.00	
Jan.	16, 1915	100.00	
Feb.	13, "	100.00	
Feb.	20, "	100.00	
Apr.	20, "	100.00	
Apr.	24, "	175.00	
May	8, "	240.00	
			$1890.00

Statement of account of bills rendered and checks received:

May	29, 1914,	for	May	$231.98	
July	1, "	"	June	187.45	
Nov.	4, "	"	July	181.55	
"	4, "	"	Oct.	188.95	
Dec.	2, "	"	Nov.	185.15	
Jan.	2, 1915, "		Dec.	185.07	
Feb.	2, "	"	Jan.	181.96	
Mar.	1, "	"	Feb.	186.40	
Apr.	1, "	"	Mar.	192.22	
May	7, "	"	Apr.	192.40	
					$1193.13

Checks received from State Society in payment of bills:

Nov.	11, 1914	$231.98	
Dec.	8, "	167.45	
Jan.	22, 1915	760.72	
Feb.	6, "	181.96	
Mar.	5, "	186.40	
Apr.	26, "	192.22	
May	8, "	182.10	
			$1902.83
Balance due Mr. Wm. A. Purrington			10.30
Paid Mr. Purrington on balance due as per last report, May 23, 1914			$376.81

Payments to Eastern Dental Society as per resolutions for moneys refunded to said society:

Dec.	2, 1914	$100.00	
Jan.	19, 1915	100.00	
May	7, "	225.00	
			$425.00

Bill rendered by Dr. Byron W. Palmer, Seventh District, for moneys paid for attorney, detective, and witness fees, prosecution of Andes case $125.00

Paid on a/c Jan. 20, '15 50.00 $50.00

Balance due Dr. Palmer $75.00

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RECAPITULATION.

Moneys paid to William Carr, chairman, by Dr. Butler, Treasurer	$2754.64	
Checks paid to Mr. Purrington in payment of bills		$1902.83
Paid Mr. Purrington on balance due as per last report. May 23, 1914 ..		376.81
Payments to Eastern Dental Society as per resolutions for moneys refunded to said society .		425.00
Paid to Dr. B. W. Palmer, Seventh District, for lawyers' fees, prosecution		50.00
		$2754.64

Moneys paid by William Carr, chairman, to Alexander C. Tandlich for detective services, carfares, photographs, fees for operations, county clerks' certificates, and witness fees.

May	9–May 30, '14..	$58.23
June	6–June 29, " ..	75.30
July	4–July 31, " ..	87.70
Aug.	8–Aug. 29, " ..	73.30
Sept.	5–Sept. 26, " ..	73.00
Oct.	3–Oct. 24, " ..	74.00
Nov.	7–Nov. 28, " ..	97.50
Dec.	5–Dec. 26, " ..	81.60
Jan.	2–Jan. 30, '15..	105.25
Feb.	6–Feb. 27, '15 ..	$80.00
Mar.	6–Mar. 27, " ..	82.30
Apr.	3–Apr. 25, " ..	87.00
May	1–May 8, " ..	42.00
		$1017.18

Balance due Dr. William Carr, chairman, as per last report	5675.22
Total balance due Dr. Carr	$6692.40

Respectfully submitted,

WILLIAM CARR, *Chairman.*

P.S. In addition to the moneys received from the Treasurer and expended as above, I have spent of my own money the following items:

Burns detective agency	$450.00
Additional detective, Chas. Ledger	508.69
Total, for which I hold vouchers	$958.69

The above amount I have not charged to the society, nor have I charged for postage, telegrams, traveling expenses, and the service of detectives employed to trace D'Amato, which sum added to the above two items will bring my expenditures over $1000.

Examined and found correct:

C. A. BRADSHAW,
L. TIMERMAN,
C. C. BACHMAN,
By-laws Committee.

Report of Committee of Arrangements.

ALBANY, N. Y., May 7, 1915.

TO THE COUNCIL:

Gentlemen,—The Committee on Arrangements respectfully presents for your consideration the attached report:

Fixtures in charge of committee are seven chairs, two portraits, two easels, place cards, combination board, stand at the Lister Parker Co. No. 2 Park ave., Albany, N. Y. Upon orders from the Executive Council the pictures were reframed and enclosed in a hinged case for their protection by the J. Vint Co., 34 N. Pearl st., Albany, N. Y.

Respectfully submitted,

GEORGE VANDERPOOL, *Chairman.*

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Report of Clinic Committee.

ALBANY, N. Y., May 7, 1915.

TO THE COUNCIL:

Gentlemen,—The Clinic Committee respectfully presents for your consideration the following report:

The clinics for this year will be as follows:

Dr. W. A. Capon, Philadelphia, Pa. "Porcelain Crowns, Using Models, and Specimen of Work Completed."

Dr. C. H. Barnes, Syracuse, N. Y. "A Permanent Splint for Vital Teeth."

Dr. G. E. Jackson, Buffalo, N. Y. "Bridge Work for Special Cases."

Dr. Frank W. Low, Buffalo, N. Y. "Method of Root-filling with a View to Facilitate Subsequent Radiographic Investigation."

Dr. John T. Knox, Brooklyn, N. Y. "A New and Improved Post Puller."

Dr. F. H. Nies, Brooklyn, N. Y. "Demonstrating the Use of an Embedded Anchor Bar and Perforated Pin in Constructing Detachable Porcelain Crown Dentures."

Dr. C. T. Van Woert, Brooklyn, N. Y. "Nielsin, a Self-separating Impression Plaster."

Dr. Theodor Blum, New York City, N. Y. "Demonstration on Wet Anatomical Specimens of the Technique of Local and Conductive Anesthesia, with Special Consideration of the Anatomy of the Soft Tissues and the Osteology of the Parts Involved."

Dr. Forry R. Getz, New York City, N. Y. "Some Instruments Indispensable to Efficient Root-canal Work, in Enlarging and Cleansing the Root-canals, Particularly of the Posterior Teeth."

Dr. J. Bethune Stein, New York City, N. Y. "Syphilitic Lesions in and about the Buccal Cavity Demonstrated by Wax Models and Autochrome Slides."

Dr. H. E. Reynolds, Buffalo, N. Y. "The Green-Supplee Method of Taking Impressions and Demonstration of the Gysi Articulator."

Dr. Henry Sage Dunning, New York City, N. Y. "Moving Picture Film Picturing the Fischer Technique of Local and Conductive Novocain Anesthesia."

Dr. T. A. Hicks, Buffalo, N. Y. "Diagnosis and Treatment of Pyorrhea."

Dr. W. B. Dills, New York City, N. Y. "Combination Gold and Porcelain Inlay."

This will be the second year that we have departed from the old custom of a large number of general clinics, and have adopted the lecture-progressive type. The Clinic Committee would appreciate any criticisms of the method of conducting the clinics and any suggestions for making them more interesting and instructive another year.

WARRINGTON G. LEWIS, *Chairman*.

Report of By-laws Committee.

TO THE COUNCIL:

Gentlemen.—The By-laws Committee hereby submit the following report:

Having examined the accounts of the Treasurer, and chairman of the Law Committee, we find them correct.

The chairman of the Exhibit Committee submitted a gratifying report.

The Oral Hygiene Committee submitted an excellent report and we desire to compliment its chairman on the same.

Respectfully submitted,

C. A. BRADSHAW, *Chairman*.

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Report of Committee on Ethics.

ALBANY, N. Y., May 1, 1915.

TO THE COUNCIL:

The Ethics Committee respectfully presents for your consideration the attached report:

There has been nothing reported during the past year requiring action by this committee.

J. N. GARLINGHOUSE, *Chairman,*
F. H. TATLOCK,
P. S. OAKLEY,
Committee.

Report of Committee on Trained Nurses.

TO THE COUNCIL:

Gentlemen,—The committee respectfully presents for your consideration the following report:

That consideration should at this time be given to the matter of assistants in the practice of dental prophylaxis, and to this end would recommend that this Council consider the incorporation in the next bill to be presented to the State Legislature a clause similar to Section 12 of a bill recently presented to the Connecticut State Legislature, viz:

"Sec. 12. A registered dentist may employ a woman assistant or assistants, which assistants shall be known as dental hygienists. The dental hygienist may remove all lime deposits, accretions, and stains from the exposed surfaces of the teeth and directly beneath the free margins of the gums, but shall not perform any other operation on the teeth or mouth, or on any diseased tissues of the mouth. They may operate in the office of a registered dentist, or in public or private institutions such as schools, hospitals, orphan asylums, and sanitariums, under the general supervision of a registered dentist, but not otherwise. The dental commission may revoke the license of any registered dentist who shall permit any dental hygienist operating under his general supervision to perform any operation other than that permitted by this section."

A. C. RICH, *Chairman,*
W. W. SMITH,
Committee.

Report of the Legislative Committee.

ALBANY, N. Y., May 7, 1915.

TO THE COUNCIL:

The Legislative Committee respectfully presents for your consideration the attached report:

During the 1914–15 session of the legislature the following bills relating to the practice of dentistry have been introduced:

Assembly Bill No. 151, introduced by Mr. Boyd, amending sections 190, 195, 196, 197, 199, 200, 201, 203, public-health law relative to definition of practice of dentistry; reorganizing the state board of dental examiners and relative to licenses, correction of books of dental registry, and penalties.

Referred to Public Health Committee. Never reported out.

Assembly Bill No. 504 introduced by Mr. Tudor, amending sections 190, 195, 196, 197, 199, 200, 201, 202, 203, public-health law, relative to the practice of dentistry, the appointment of members of the state board of dental examiners, licenses, correction of books of dental registry, and penalties.

Referred to Judiciary Committee. Never reported out.

Assembly Bill No. 675, introduced by Mr.

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Scharlin, adding new section 578 to education law, requiring local school authorities in first-class cities to provide properly equipped dental dispensaries, in charge of dentists, for free dental treatment of pupils.

Referred to Cities Committee. Never reported out.

Assembly Bill No. 722, introduced by Mr. Seelye, amending sections 190, 195, 196, 197, 199, 200, 201, 202, and 203, public-health law, generally, relative to the practice of dentistry, and providing for the appointment by the Regents of a supervisor of dental registrations at $4000 a year, to have special supervision over the registration of dentists, and issuing certificates under rules to be prescribed by the Regents, and making other provisions.

Referred to Public Health Committee. Never reported out.

Assembly Bill No. 1109, introduced by Mr. Fuess, amending section 198, public-health law, by authorizing the Regents to issue a dentist's license without examination to an applicant who holds a license to practice dentistry in any state granted by a state board of dental examiners at least six years preceding the application, and who furnishes satisfactory proof that he has been duly graduated from a registered dental school.

Referred to Public Health Committee. Never reported out.

Feb. 15, 1915. Resolution introduced to Assembly by Mr. McCue, that a committee be appointed to investigate the organization and administration of the functions of the State Dental Society and district dental societies, particularly the registration of persons practicing dentistry, the revocation of licenses and the disposition of surplus from examination fees, and the disposition of all fines, penalties, and forfeitures.

Referred to Ways and Means Committee. Never reported out.

Senate Bill No. 25, introduced January 14, 1915, by Mr. Dunnigan. Amending section 199, public-health law, relative to registration of licenses to practice dentistry in a new county created by the legislature from an existing county, thus causing the licensee's office or practice to be in a new county.

Reported to Public Health Committee. February 25th, reported to committee of the whole. March 2d, Assembly Bill 37 substituted.

Assembly Bill No. 37, introduced January 13, 1915, by Mr. Evans, amending section 199, public-health law, relative to registration of licenses to practice dentistry in a new county created by the legislature from an existing county, thus causing the licensee's office or practice to be in a new county.

Reported to Public Health Committee. February 18th, reported to second reading. February 22d, to third reading. March 1st, passed. March 2d, in Senate, Rec. No. 125. Substituted for S. Bill 25 in Committee of the whole. March 3d, to third reading. March 4th passed. March 10th to Governor. March 11th, approved. Chapter 54.

Senate Bill No. 1570, introduced April 14, 1915, by Mr. Walker, amending subdivision 4, section 196, public-health law, by providing that for certain applicants for dental certificates the examination shall be in practical operative dentistry only.

Reported to Public Health Committee. April 21st, reported to third reading. April 22d, passed. In Assembly, Rec. No. 553. To Public Health Committee. April 24th, reported, to third reading. Passed.

This committee recommends that the State Society employ some person to report all bills and resolutions introduced to the Senate and Assembly, and to furnish all information upon such bills relating to the practice of dentistry in New York State to the proper committee.

Respectfully submitted,

GEORGE VANDEBPOOL, *Chairman.*

Report of Finance Committee on Research.

TO THE COUNCIL:

Gentlemen,—The Committee on Scientific Research respectfully presents for your consideration the following:

Subscriptions received and forwarded to Dr. Weston A. Price, Cleveland, Ohio, chairman of the Scientific Foundation and Research Commission of the N. D. A.

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DONATIONS.

DISTRICTS.	Five years' total.	Annual amount.	Additional for current year.
First District	$1855.00	$371.00	$240.00
Second "	775.00	157.00	200.00
Third "	75.00	15.00	125.00
Fourth "	20.00	4.00	200.00
Fifth "	310.00	62.00	200.00
Sixth "	50.00	10.00	2.00
Seventh "	350.00	70.00	207.00
Eighth "	890.00	178.00	205.00
Ninth "	200.00	40.00	100.00
Unaffiliated with District societies	872.50	174.50	.....
Birmingham Dental Society	.....	.....	10.00
	$5397.50	$1081.50	$1489.00

Contributions from District Society Treasuries (included in 3d column above).

First District	$200.00
Second "	200.00
Third "	100.00
Fourth "	200.00
Fifth "	200.00
Seventh "	200.00
Eighth District	$200.00
Ninth "	100.00
	$1400.00

The Ninth District Dental Society is to hold a special meeting at Albany on May 13th, to consider what action it will take.

The Birmingham Dental Society sent a contribution of $10 to Dr. Price direct.

HENRY W. GILLETT, *Chairman.*
WM. B. DUNNING,
W. S. ROSE.

Report of State Library Committee.

ALBANY, N. Y., May 14, 1915.

TO THE COUNCIL:

Gentlemen,—The State Library Committee respectfully presents for your consideration the attached report:

The following books have been added to the library during the year:

Bolk, L. "Die Morphogenie des Primatenzahne." 1914.

Brown, G. V. "Surgery of Oral Diseases." 1912.

Fischer, G. "Bau und Entwickelung der Mundhöhle des Menschen." 1909.

Fischer, G. "Local Anesthesia in Dentistry," 2d ed. 1914.

Preiswerk, G. "Atlas and Text-book of Dentistry." 1909.

Talbot, E. S. "Irregularities of the Teeth," 5th ed. 1903.

Tomes, C. S. "Manual of Dental Anatomy," 7th ed. 1914.

Winter, G. B. "Exodontia." 1913.

Bödecker, H. W. C. "The Metallic Inlay." (Presented by the author.)

The library is in need of a large number of dental periodicals, a list of which will be sent to any member desiring to make donations to the library.

Donations of professional books will also be appreciated. Those having books or periodicals which they wish to present to the library may communicate with the chairman of the committee.

HERBERT L. WHEELER, *Chairman.*

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Report of Committee on Dental Service in State Institutions.

TO THE COUNCIL:

Gentlemen,—The Committee on Dental Service in State Institutions respectfully presents for your consideration the following report:

Your committee has made an effort this year to have enacted a law preventing the employment of convicts for dental work unless supervised by a legal citizen practitioner. We endeavored to have such a provision incorporated in the general dental bill this year, and enlisted the help of Dr. Cooke, chairman of the special committee on legislation, also Dr. Wright, our president; but the department of Education would not stand for it, on the ground that it was unnecessary, as it was already regulated by law.

We also tried through Assemblyman Law of the Committee on Prisons to have an appropriation made for the purpose of defraying the cost of a special appointee in each state prison. He urged that we should not push it this year. He believed that it might be done next year, when the economy tension would not be so great. We would add that only one of the state penal institutions is now employing convict talent to take charge of the dental work therein. This is due largely to the fact that dental convicts are not so numerous as heretofore.

We have assurance from the fiscal supervisor of the United Charities department that all cases of illegal men doing dental work in institutions other than the penal to which we called his attention had been "cut out." He assured us, also, that there would be no moneys paid for such services until it was found that such employees were duly licensed.

Respectfully submitted,

ALBERT W. TWIGGAR, *Chairman*,
STEPHEN PALMER,
JOHN B. WEST.

Report of the Committee on Necrology.

TO THE COUNCIL:

Gentlemen,—The Necrology Committee respectfully presents for your consideration the following report:

The district societies have taken action concerning their members whose demise has taken place during the year. In several cases, although the activities of these men have been chiefly local, their work has been of such a character as to make their loss to the profession very widely felt.

Your committee has made its report upon those deceased members who have been more especially active in the immediate work of the State Society.

Dr. ALEXANDER M. HOLMES died on July 31, 1914, in Morrisville, N. Y., in his eighty-eighth year.

Dr. Holmes was the last survivor of the twenty-one dentists who met in December 1867 at Utica to consider plans for the passage of a law regulating the practice of dentistry and for the organization of a dental society for the State of New York.

This law was passed in the spring of 1868, and Dr. Holmes was one of the delegates who met and organized the State Society and was one of the first twenty permanent members which the law required. He was elected to membership on the board of censors in 1879, and continued on that board and on its successor, the board of dental examiners, until his death, thirty-five years later. He was made president of the New York State Dental Society in 1878.

Dr. Holmes was a man of unusual ability and judgment, and although modest was always forced to the front in his professional, political and business activities. He was a member of the county board of supervisors for thirty-two years, was elected in 1860 and re-elected in 1864 as county treasurer, was a member of the Republican National Convention which re-nominated President Grant, served as state senator, was one of the organ-

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izers of the First National Bank of Morrisville, was its president for forty years, and was identified with many other enterprises.

Dr. RALPH E. LUTHER of Rochester, N. Y., died on February 12, 1915, in Chicago, at the age of thirty-eight.

Upon being graduated from the University of Buffalo, in 1900, Dr. Luther began to practice in Batavia, N. Y., and gradually but positively developed into one of the leading exponents of the modern interpretation of oral prophylaxis. His work was recognized by this society, which made him chairman of its Committee on Oral Hygiene.

In 1914 Dr. Luther began the practice of oral prophylaxis as a specialty in Rochester, N. Y., and at the time of his death was doing special work on pyorrhea in Chicago. In addition to his professional work, he was prominently identified with different society and fraternal organizations and was especially greatly appreciated by the boys in his Y. M. C. A. and Boy Scout activities.

Dr. H. J. Burkhart, also of Batavia, says of Dr. Luther that—"He was a man of fine ability as an operator, and gave much promise of a brilliant future. He was an upright, conscientious, high-class professional man, one who observed all the finer rules of conduct toward his patients and the profession. He was a splendid type of a high-toned professional gentleman. In his death his profession loses an intelligent, able, and indefatigable worker, and his family and friends a kind, generous and lovable companion."

Dr. J. MORGAN HOWE, M.D.S., M.D., died on November 13, 1914, in New York, N. Y.

Dr. Howe was born in New York City on October 19, 1844, began the practice of dentistry in the same city in 1867, and practiced here until his death at the age of seventy. He impersonated the true ethical spirit, and was always found identified with efforts making for the dignifying and upbuilding of his chosen profession. For several years he was secretary of the New York Odontological Society, was a charter member of the Institute of Stomatology, and closely identified with its research work, and during his later years organized and directed the St. Bartholomew Clinic.

Dr. Howe in his life exemplified the true professional gentleman, and in his death the profession loses an active, useful and exemplary member.

W. S. ROSE,
W. J. LEAKE,
B. C. NASH,
Committee.

Report of the Oral Hygiene Committee.

TO THE COUNCIL:

Gentlemen,—We are deeply sensible of the great loss which this committee, the dental profession, and the cause of Oral Hygiene have sustained in the death of our chairman, Dr. Ralph E. Luther. His keenness of perception, his high-minded ambitions, and well-balanced enthusiasm made him peculiarly adapted for the work of this committee. In recognition of his services, we adopted the following

In memoriam.

RALPH ENNIS LUTHER.

Our beloved chairman, Ralph Ennis Luther, died of pneumonia on February 12, 1915, in Chicago, where he had gone to take a special course on the treatment of pyorrhea alveolaris. Although of delicate physical organization it was scarcely appreciated by the greater number of his friends, because of the overmastering power of his intellect, which engendered great activity, wonderful ambition, and unusual executive ability. He was therefore scarcely able to estimate his own physical handicap and the grim Reaper readily claimed him as his own.

The world was before Ralph Luther! On his profession's horizon he had painted visions and achievements and successes worthy of the ideals which he worshiped and which his exceptional talents might have brought to fruition. He loved his profession; his mind was filled with it; his heart throbbed with it, and his fingers tingled with its action. Had he been spared to his profession, nothing short of dire misfortune could have prevented

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him from becoming one of its leaders whose name doubtless would have been emblazoned upon the pages of scientific achievements for the cause of humanity. Unselfish service was a part of his very existence, and he was never happier than when engaged in promoting the welfare of the unfortunate.

Truth, knowledge, and practice formed a trinity which was exemplified in his daily life and presaged a useful and righteous future. A clear thinker, a conscientious worker, and the possessor of a nature imbued with a spirit of helpfulness to others, combined to make Ralph Luther a rare man, endeared him to all, and made his loss the more keenly felt.

Dr. Luther was born in Warsaw, N. Y., in 1876, and after completing a high-school course with honors continued his studies at the University of Buffalo, Dental Department, where he was graduated in 1900 under similar favorable conditions. He entered the practice of dentistry in Batavia, where he continued with marked success until the summer of 1914, when he took up special work in Rochester, devoting his time to the treatment of pyorrhea alveolaris and kindred conditions. In January 1914, he took a course in the treatment of pyorrhea of Dr. Thomas B. Hartzell of Minneapolis. Last January he went to Chicago to pursue a special course of study at the Academy of Science in connection with the Carr method of pyorrhea treatment. After six weeks of hard work he was attacked with a severe cold, and soon developed pneumonia, to which he succumbed after two weeks of hard but unequal struggle.

His heart was in the work of this committee and he was proud of its achievements. The cause of oral hygiene formed one of his principal interests in his profession, and his loss is a great misfortune to the cause. We mourn him as a sincere dentist, an honest man, a profound student, and a beloved brother whose sterling principles ever led him upward and onward toward the right, and which surely fitted him for a place in the higher school of progress toward which all the sons of men are persistently striving. Peace to his weary soul!

Adopted May 13, 1915.

ARTHUR W. SMITH, *Chairman.*

At the annual meeting last year you generously appropriated the sum of $500 to complete the motion picture film. After consulting with numerous representative members of the profession, motion picture authorities and laymen, the film was finally completed and exhibited for the first time at the National Dental Convention, in Rochester, last July, where it received the unqualified indorsement of those who witnessed it.

Little was done during the summer in the way of exploiting the film on account of the inactivity of the dental societies at that time. In September, an illustrated booklet describing the film was sent to the presidents and secretaries of all the state societies, officers of the National Association, and other representative individuals.

The Minneapolis State Society, the Ohio State Board of Health, and the Seventh and Eighth Districts of the New York State Society have purchased copies of the film. It has been rented by societies in several cities for short exhibitions. The committee has two films in its possession available for rental purposes. There are at present several other prospective purchasers.

Plans for future advertising include an article in *Oral Hygiene*, which will appear in an early issue of that magazine.

On account of the illness and subsequent death of Dr. Luther, other plans of the committee were abandoned while still in the formative stage. It is hoped these matters will be again taken up after the committee has reorganized.

A summary of progress along Oral Hygiene lines throughout the state follows by districts.

FIRST DISTRICT.

(Waldo H. Mork. Russell K. Bryer.)

The board of education has started a series of lectures on Oral Hygiene in this district, beginning February 26, 1915. These are the only lectures of which I have heard.

Herewith follows a list of clinics in the First District:

Bellevue and Allied Hospitals. One interne. (Bellevue, Fordham, Harlem, and Gouverneur.)

Roosevelt Hospital.

New York Hospital.

Lebanon Hospital.

German Hospital.

Presbyterian Hospital.

Mount Sinai Hospital.

College of Dental and Oral Surgery (Saturday afternoons, free for school children.)

Beth Israel Hospital.

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New York Nose and Throat Hospital. Three under the auspices of the board of health—paid men.

St. Bartholomew's. Two paid men.

Bronx Hospital Dispensary.

Hospital for Deformation.

Legal Aid Society.

Good Samaritan.

SECOND DISTRICT.

(T. P. Hyatt. W. H. Frazer.)

No report.

THIRD DISTRICT.

(Mortimer J. Barrett. Morton Van Loan.)

No report.

FOURTH DISTRICT.

(Allan S. Moore. Lincoln A Timerman.)

The Oral Hygiene work in the public schools was started last year. After considerable effort by the dentists, the board of education consented to a dental inspection, the dentist being compensated for his work from the school funds. The charts used were the same as those used in Schenectady. A charitable individual of the town gave about $200 for the care of those children's teeth who could not afford to pay. The pupil was given his choice to call upon the dentist he wished.

This year Dr. Van Wie has just finished another inspection of the pupils' teeth, using part of the system used by the Albany public schools. In addition to the inspection, he has given ten-minute talks on the care of the teeth and the proper way of using the toothbrush.

As to caring for the children who cannot afford dental work, it is expected that the board of education will appropriate a sufficient amount to carry on the work already begun.

While the work has just started it is felt that much good has been done and that greater things will be accomplished in the near future.

FIFTH DISTRICT.

(R. F. Gasler. W. F. Tremain.)

Work along Oral Hygiene lines has gone backward in the southern part of the Fifth District. Syracuse has given up her free dental clinic, and there is no other in the District except in Watertown.

The only Oral Hygiene lectures given were, one in April by Dr. W. A. White in this city at a child-welfare exhibit and one last July by Dr. W. F. Tremain, before a summer school of teachers in this city, when in addition to the lecture, the State Society oral hygiene film was exhibited.

SIXTH DISTRICT.

(Herbert D. Whitmarsh. Charles M. Dunne.)

The Elmira Free Dental Clinic closed in December 1913, owing to the common council taking control of the clinic from the board of education and giving it to the board of health. The staff of dental operators refused to be a part of petty politics and refused longer to contribute their services, consequently the clinic has remained closed until recently. Since January 1915 the mayor and board of health have become interested and secured Dr. Carl Waples, a practitioner of the city, on a salary, as operator. The Elmira City Dental Society has supervision of the clinic in an advisory capacity.

We have had no lectures on Oral Hygiene in this section, so far as I know, for the past year.

SEVENTH DISTRICT.

(Arthur W. Smith. W. W. Belcher.)

An industrial fair is held annually at Exposition Park, Rochester, N. Y., and a health exhibition was one of the features of the 1914 fair. It was at this time that the Rochester Dental Society had a display advocating the establishment of industrial dental dispensaries. The work was in charge of Dr. Clare V. Howland, Rochester, N. Y., and was very well presented during the two weeks of the exposition.

Public school No. 14, Rochester, N. Y., was destroyed by fire on the evening of January 4th. The Rochester Dental Society established a free dental dispensary in this building March 22, 1905. It was the first free dental dispensary established in the public schools of the United States. The equipment contained was insured for $1000 by the society, who will suffer no financial loss. The activities of this dispensary have been transferred to school dispensary No. 26. The school is being rebuilt, and provision has been made for an ideal dental dispensary in the new building. A letter asking for finan-

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cial support has been sent out to the citizens of Rochester by the dental society. This letter was prepared by the chamber of commerce, and the dental dispensary work of the society has their official support and encouragement. The municipality have awarded the Rochester Dental Society $4000 in support of the dental dispensary work for the coming year. This amount will be turned over to the treasurer, Dr. F. M. Rood, and be under the control of the dental society.

The Seventh District Dental Society has purchased the film "Oral Health," and during the coming year will use it extensively in this territory.

EIGHTH DISTRICT.

(Ralph E. Luther. J. Wright Beach.)

The principal work of the Eighth district has been confined to the establishing and the development of free dental clinics for the benefit of the worthy poor, with special reference to the care of public school children.

The health commissioner of Buffalo, Dr. Francis E. Fronzack, appointed D. H. Squire, M. B. Eshleman, F. L. Dayment, J. W. Beach and Abram Hoffman, chairman, to act as dental advisory board, with full power to establish and conduct free dispensaries. Dr. Beach has the honor of representing our committee on this board.

An appropriation of $7000 was made by the city, with which two dispensaries were equipped. Two inspectors, two operators, and two women assistants are employed. A third clinic is operated in conjunction with the dental department of the University of Buffalo, which is termed the central dental clinic, and four chairs are in continuous use, for which $1000 of the appropriation was used.

It is planned to forward the cause of dental education by means of lectures and to use the motion-picture film belonging to the State Society for that purpose. The Eighth District Dental Society recently purchased this film for use in Buffalo and vicinity. It has been used on two occasions, and requests have been received from schools and other institutions for its use. Numerous lectures and talks have been given by individual dentists before clubs and societies. One of the dental inspectors has given several lectures before teachers and scholars in different public schools. Good work has been accomplished through volunteer service in the care of eighty children at the Buffalo Orphan Asylum. A chair is maintained in this way at the Crippled Children's Guild and the Society for the Prevention of Tuberculosis has a paid interne and well-equipped clinic, where tubercular patients are given necessary treatment. In different parts of the Eighth District good work is being done. At Olean the cause of Oral Hygiene has made considerable progress during the past year, and a clinic is about to be established. At Batavia similar conditions exist, and a full clinic is cared for through volunteer service. A free clinic has been established at Fredonia, and at Niagara Falls steps are being taken to do likewise.

The University of Buffalo, Dental Department, is maintaining a free clinic at the Church Home, where about seventy-five children are being cared for, as are the children at Welcome Hall also, so that in the aggregate much free work is being done in Buffalo. The plans as outlined for the coming year call for much work in this field and the ambition of the workers in this district is to establish more free clinics in the public school buildings with the ultimate object of taking full charge dentally of the children during the eight years of their attendance. This time is the most important period of their dental development, covering as it does the eruption of the twenty-eight teeth.

NINTH DISTRICT.

(Stephen Palmer. W. V. Randall.)

There has been very little activity in the district during the year, as it seemed expedient to await developments at Albany.

There have been a few individual talks given by district members. Tentative plans for a general district work have been mapped out, but owing to a change in the personnel of the district members of the committee, it cannot be said just what will be done next fall.

A dental clinic has been opened in White Plains, Westchester co., and the members of the Poughkeepsie Institute of Dentistry—a city society—as a society have pledged themselves to equip a modern clinic in Poughkeepsie, and $50 each ($500) in cash toward the salaries of an operator and nurse, pro-

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viding the board of education will provide the remainder of the salaries, and the maintainance of the dispensary for one year, dispensary to be open every day from 8:30 A.M. to 12:30 P.M. from September 1st to July 1st.

The proposition has met with partial favor by the school board, and a dispensary will be open in September undoubtedly.

The foregoing reports show a static or even retrograde movement in the field of Oral Hygiene—except in the Eighth District—due to the business depression and to the unfortunate cessation of the efforts of Dr. White and the Oral Hygiene work of the state department of Health. It is hoped that the coming year will bring forth renewed activity in this direction, both in the Health department and in the various societies throughout the state.

As a part of the work of the Oral Hygiene Committee for the coming year, it is proposed that the matter of producing and marketing phonographic records of lectures on Oral Hygiene be considered.

The expense of producing such records would be slight, and their utility would be great. The advent of the phonograph in the public schools and other institutions for educational purposes makes the field almost limitless, and introduces the subject of the care of the mouth in an easier and perhaps more impressive manner than a lecture.

I would like to state that it is the suggestion of Dr. Burridge of San Francisco that our committee take up this work.

On behalf of the committee, I wish to express our appreciation for the encouragement and generous support which the Executive Council has given us during the past year.

We trust that you will have no reason to feel that your confidence has been misplaced.

Respectfully submitted,

ARTHUR W. SMITH, *Chairman pro tem.*

SUPPLEMENTAL REPORT.

REPORT SUBMITTED BY A. W. SMITH, *Sec'y.*

Receipts.

From treasurer of State Society, December 1913	$100.00
Forward	$100.00

Expenditures.

(December 1913 to date.)

Postage	$14.50	
Stenographer	20.00	
Expenses of participants in motion picture	35.00	
Dr. Luther's expenses in coming to Rochester, etc.	8.50	
Personal expenses, supplies, carfares, express, etc.	34.50	
Balance due	12.50	$12.50
	$112.50	$112.50

Balance $12.50 charged to H. D. Whitmarsh, treasurer.

REPORT SUBMITTED BY H. D. WHITMARSH, *Treas.*

Received.

1914	From	
June 30,	state treasury	$500.00
July 30,	A. W. Smith, rental	5.00
Oct. 13,	" " " "	30.00
" 21,	" " " "	10.00
Nov. 27,	" " " film	100.00
Dec. 12,	" " " rental	5.00
1915		
Mar. 19,	" " " film	150.00
		$800.00

Expenditures.

1914	To	
June 30,	C. T. Hovay	$15.75
" "	Monroe Printing Co	12.00
July 10,	Sam Sloan Co.	3.35
" 10,	C. R. Theuer Rauff	7.50
" 15,	Miss Ford	20.00
" 15,	Lyman letter shop	7.50
" 15,	Rochester Motion Picture Co.	250.00
Aug. 4,	Johnson-Primrose Dental Co.	1.42
" 21,	A. G. Denarie	4.00
" 27,	H. L. Zelter Co.	1.50
Oct. 6,	A. G. Denarie	1.00
" 13,	Rochester Motion Pic. Co.	100.00
Nov. 11,	B. F. Culver	10.60
July 22,	M. S. Electric	15.00
" 31,	" " "	10.00
Dec. 12,	Rochester Motion Pic. Co.	104.85
" 10,	Fix & Miller	22.00

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1915		
Jan. 16,	James Connelly Co.	3.75
Mar. 24,	Rochester Motion Pic. Co. .	100.60
	Dr. Luther	6.82
	Dr. A. W. Smith	12.50
	" " " " postage ..	.80
		$710.94
	Balance on hand	89.06
		$800.00

SUMMARY.

Balance cash on hand	$89.06
Bills receivable.	
Minneapolis City Society, balance due on film	50.00
Eighth District, for film purchased .	150.00
Seventh District, " " " .	150.00
	$439.06

Forward		$439.06
Bills due.		
Rochester Motion Picture Co. for Seventh and Eighth District films	$201.50	
R. R. fare in delivering film	1.38	212.88
Balance		$226.18
Typewriting report		.75
Balance		$225.43

H. D. WHITMARSH, *Treasurer.*

Examined and found correct:

C. A. BRADSHAW,
L. TIMERMAN,
C. C. BACHMAN,
By-laws Committee.

Report of Committee on Registration.

ALBANY, N. Y., May 1, 1915.

TO THE COUNCIL:

Gentlemen,—The Registration Committee respectfully presents for your consideration the following:

The Registration Committee reports that at the last meeting we endeavored to follow the instruction of the Executive Council, to allow no one to register who was not qualified to do so, and to allow no one to attend the session who was not registered.

Admission to the session was by badges given at the time of registration. We were fairly successful.

The registration book was in charge of Miss Mabel Talmadge, and she reported the names of 284 members and 95 guests, making a total attendance of 379. Practically the same arrangements are made for this year.

G. H. BUTLER, *Chairman,*
J. G. ROBERTS,
C. G. ALLEN,
Committee.

Committee on Exhibits.

TO THE COUNCIL:

Gentlemen,—The Committee on Exhibits respectfully presents for your consideration the following:

Receipts.

Cleveland Dental Mfg. Co.	$60.00
Chas. H. Phillips Chem. Co.	20.00
American Cabinet Co.	40.00
Vernas Chemical Co.	20.00
Stone & Eddy Co.	20.00
Kolynos Co.	30.00
Johnson & Lund	20.00
Adrien S. Rutherford	30.00
Weissfeld Bros.	20.00
Carmi Lustro Co.	20.00
Sam'l G. Supplee	20.00

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Electro Dental Mfg. Co.	$20.00
Pelton & Crane	20.00
S. S. White Dental Mfg. Co.	60.00
Lavoris Chem. Co.	20.00
L. D. Caulk Co.	20.00
Kress & Owen	20.00
Denver Chem. Co.	20.00
W. V-B. Ames	20.00
Horlick's Malted Milk Co.	20.00
A. C. Clark & Co.	30.00
J. W. Ivory	20.00
Absorbine, Jr.	20.00
Dentists Supply Co.	33.33
Colgate & Co.	20.00
Dental Protective Supply Co.	20.00
Ritter Dental Mfg. Co.	53.33
H. D. Justi & Son	33.33
David B. Levy	20.00
Lee Smith & Son Co.	23.33
W. M. Sharp Co.	20.00
Consolidated Dent. Mfg. Co.	20.00
Kal Pheno Chem. Co	20.00
W. H. Leak Mfg. Co.	20.00
Stratford Cookson Co.	20.00
H. Fischer Co.	20.66
Dubilier Electric Co.	20.00
	$939.98

Expenditures.

Paid Ten Eyck Co.	$354.39
" " " " (sign)	1.00
" G. H. Butler, Treasurer	522.26
" " " " "	63.33
	$940.98

The $1.00 discrepancy is the $1.00 paid the Ten Eyck for a sign; I also failed to deduct my own expense as follows:

Feb.	12, 1914,	printing letters to exhibitors	$2.50
"	13, "	100 postage stamps	2.00
"	14, "	50 " "	1.00
April	15, "	printing letters to exhibitors	1.50
"	15, "	postage	1.00
May	13, "	tips to porters, workmen, etc.	6.00
			$13.50
		The sign	1.00
		Total amount due me	$14.50

Which amount I will deduct from the receipts of the present meeting, May 1915.

O. J. Gross, *Chairman.*
E. B. Rhinehart.

Committee on Amendments to By-laws.

Albany, N. Y., May 14, 1915.

To the Council:

Gentlemen,—The Amendments to By-laws Committee respectfully presents for your consideration the following:

Section 4: Correct typographical error by inserting numerals "39" in place of "36" after word "Section" in second paragraph.

Section 4: Amend by adding words "or reside" after the word "practice" at the end of 2d paragraph.

Section 4: Amend by adding at end of second paragraph the following: "But a legal member of a district society in good standing may remove his residence or practice or both without affecting his membership in the State Society."

Page 33: Correct typographical error by inserting word "to" in place of word "of" in "Recommendations of District Societies" at top of Section 42.

Section 42: Amend by adding a new paragraph to read as follows: "Practitioners of dentistry who are eligible to active membership in any district society shall be members of but one district society, except that this shall not be construed to mean that a member having once been legally elected to membership in one district society shall be compelled to change his membership because of change of residence and place of practice."

Section 42: Amend by adding new paragraph as follows: "There shall be no associate members elected in district societies except from outside the State of New York, from May 15, 1914."

Section 49: Amend first paragraph by adding after the words, "meeting of said Council," on seventh line, the following: "Except that an amendment, presented without objection at the first session of the Executive Council, may be acted upon at a meeting held not less than twenty-four hours subsequently."

Horace P. Gould, *Chairman.*
Herbert L. Wheeler.

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Liability Insurance Committee.

ALBANY, N. Y., May 14, 1915.

TO THE COUNCIL:

Gentlemen,—The Liability Insurance Committee respectfully presents for your consideration the following:

Your committee finds that the dues in the county medical society are $13 per member per annum, $3 of which is remitted to the state society by district treasurers. This $3 pays expenses, including publication of journal, directory, and defense against suit for alleged malpractice.

The latest report shows a membership in the state medical society of 7800, who are defended in any suits instituted against them by James Taylor Lewis, the state society counsel, for a fixed retainer of $6500 per annum, which is less than $1 per capita. This does not cover payment of damages which might be recovered against a practitioner, but the society boasts that it has never lost a suit, although they have had to carry several to higher courts. We are informed by reliable authority that a larger retainer will probably be demanded this year.

Many of our members in New York City are insured under a "physicians' liability policy" issued by the Fidelity and Casualty Co., which defends against suit and guarantees against damages recovered to the extent of $15,000. Your committee could get no contract with them to insure us as a body at a lower premium, they claiming the law did not permit reduction of premiums under any conditions.

Appended is an offer from John G. Dyer to defend the society members at a retainer which, while higher per capita than paid by the state medical society, seems to your committee to be reasonable, considering the relatively smaller membership in our society.

Mr. Dyer is counsel for the Kings County Medical, the Pedic Society, and the New Jersey Medical Association.

April 28, 1915.

Dr. HORACE GOULD, 181 Joralemon st., Brooklyn, N. Y.

My dear Dr. Gould,—Pursuant to your request that I send you in writing an opinion of the approximate cost of a malpractice defense for members of the Dental Society of the State of New York, I make you the following offer: I am willing to defend malpractice actions brought in the State of New York against members of the Dental Society, at a net cost to the association of $1500 per year. This offer is separate and distinct from my offer to prosecute the illegal practice of dentistry in the State of New York. I base the offer made here upon the number of your members, and estimate an average cost of about $1.25 per member per year. I think that this will give you a working basis to establish your malpractice defense system and to test its efficacy.

With kindest regards, I am

Very truly yours,

JOHN G. DYER.

ATTORNEY AND COUNSEL TO SOCIETY.

The attached communications from Mr. J. G. Dyer need no explanation, except that Mr. Dyer will under no consideration accept this work unless he has absolute control of agents.

January 28, 1915.

Dr. HORACE GOULD, 181 Joralemon st., Brooklyn, N. Y.

My dear Dr. Gould,—Pursuant to your request for a statement of conditions upon which I would accept the retainer of the Dental Society of the State of New York, I send you the following offer:

I will prosecute personally throughout the State of New York every violation of the dental law of this state where evidence sufficient to institute criminal prosecution is presented to me either by private individuals or by my employed investigators; supervise and direct the investigation of all complaints of illegal practice of dentistry in the State of New York; and act as counsel to the society in all matters affecting its interests, for an annual retainer of twenty-five hundred dollars per year. For this sum I will render my own services as outlined, and employ and pay all agents and all disbursements made in the prosecution of the illegal practitioners of dentistry. Whatever fines may be imposed may be ap-

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plied by the society to the reduction of its cost of prosecution.

I trust that this offer meets the conditions of your request, and that I may have the honor to represent the Dental Society of the State of New York as its counsel.

Faithfully yours,

JOHN G. DYER.

January 28, 1915.

Dr. HORACE GOULD, 181 Joralemon st., Brooklyn, N. Y.

Dear Dr. Gould,—I have this day sent you the statement you have requested. I may say in addition thereto that I have made a very reasonable offer. I am at present counsel to the Medical Society of the County of Kings and counsel to the Pedic Society of the State of New York. I expect to be retained shortly by the veterinary surgeons of the state. I might further call your attention to the fact that I have caused some two or three hundred arrests on criminal charges, and have never had a malicious prosecution instituted against the societies I represent.

I hope that I may have the honor of the Dental Society retainer. With kindest regards, I am

Faithfully yours,

JOHN G. DYER.

HORACE P. GOULD, *Chairman*,
HERBERT L. WHEELER.

Report of Dental Index Bureau Committee.

The Dental Index Bureau, to which the Dental Society of New York State is a subscriber, has been delayed for several years, partly because the importance of the project demanded a carefully worked out plan and a reasonable assurance of permanence before publication was begun. The work of indexing and publication has been directly in the hands of Dr. A. D. Black of Chicago. During the last year Dr. Black has been largely occupied in another line of work, from which he is now released, and accordingly promises an early announcement relative to the publication of the Index.

J. O. MCCALL,
Chairman Index Bureau Committee.

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REPORTS FROM THE DISTRICT SOCIETIES.

First District.

THE annual meeting of the First District Dental Society of the State of New York was held April 5, 1915, and the following persons were elected officers for the ensuing year:

President—W. D. Tracy.
Vice-president—W. B. Dunning.
Recording Secretary—Leland Barrett.
Corresponding Secretary—J. Russell Watson.
Treasurer—Bissell B. Palmer, Jr.
Librarian—O. J. Chase, Jr.
Curator—W. T. Van Winkle.
Editor—Wm. J. Lederer.
Supervisor of Sections—Chas. F. Ash.
Executive Committee—C. W. Rubsam, F. C. Kemple, O. J. Chase (*chairman*).

The following were elected to serve on State Society Committees: Wm. Carr (Law); Gladstone Goode, (Legislative); Waldo Mork and W. T. Van Winkle (Oral Hygiene).

During the year just past the following deaths have been reported: Louis Jack and James Truman (honorary); J. Morgan Howe, J. H. Mayer, Leslie E Palmer, and L. S. Rosensteil (active); Edw. H. Webb (associate).

During the year our special features were kept up, and stimulated much interest in the meetings—that is, three or four interesting clinics monthly at 5 P.M.—average attendance about 80—followed by an informal dinner at a nearby restaurant, and that followed by the regular meeting in the evening on the first Monday of each month.

At these meetings the following topics were discussed: Frank Delabarre of Boston, on "A Study of the Physical Development of the Occlusal Curve." W. J. Gies and A. P. Lothrop, on "A Study of the Effects of Acid on Natural Extracted Teeth." O. J. Chase, Jr., on "Examination of the Mouth." Forry R. Getz, on "Bridge Work Restorations Without Extensive Cutting and Mutilation." M. C. Tracy, on "The Importance of Oral Prophylaxis During Orthodontic Treatment." Paul Stillman, on "The Tooth-brush; Its Application." Wm. Carr, on "Epulis." Eugene Smith of Boston, on "The True Value of a Tooth in Health and in Disease." Mr. T. A. Forsyth and Dr. H. DeWitt Cross of Boston, on "The Forsyth Dental Infirmary."

In place of the usual banquet, and in view of the fearful conditions abroad, a Ladies' Night was held on December 18, 1914, and the net proceeds, amounting to $23, were forwarded to the American Ambulance Hospital in Paris.

At the annual meeting, April 5, 1915, after a talk by Mr. W. A. Purrington and considerable discussion, Dr. Wheeler moved, and it was seconded and carried, that this society request the Dental Society of the State of New York to investigate the so-called charges of graft, etc., in the conduct of the Law Committee.

Respectfully submitted,
LELAND BARRETT, *Rec. Sec'y.*

ACTIVE MEMBERS.

Abel, L. Hosford, 40 E. 41st st.
Adams, Irving F., 160 W. 106th st.
Addelston, W. M., 73 E. 92d st.
Agostini, E. M., 97 Central Park West
Andrade, Alex., 123 W. 95th st.
Arkin, David M., 100 W. 87th st.
Armstrong, Herbert R., 200 W. 72d st.
Aronson, Geo. G., 507 Fifth ave.
Aronstein, Wm., 100 W. 117th st.
Asch, Andrew J., 331 Madison ave.
Asch, Jacob, 300 Central Park West.
Ash, Chas. F., 115 Broadway.

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Babcock, Ralph W., 268 Madison ave.
Baker, David C., 516 Fifth ave.
Baker, Edward W., 119 W. 121st st.
Baldwin, Harold L., 40 E. 41st st.
Baldwin, L. C., 167 W. 71st st.
Ballin, Irving J., 164 E. 72d st.
Bark, Arthur W., 779 Madison ave.
Barker, Clinton Reed, 57 W. 50th st.
Barnard, Wm. E., 40 E. 41st st.
Barrett, Leland, 215 W. 116th st.
Bate, Jacob, 758 W. End ave.
Beekman, A. R., 24 E. 48th st.
Beiser, H. E., 250 W. 74th st.
Bendernagel, James F., 451 W. End ave.
Benney, Walter, 352 W. 23d st.
Berger, Adolph, 158 E. 79th st.
Berlin, Simon, 1800 Seventh ave.
Betzig, Edward P., 417 E. 143d st.
Beyer, Fritz A., 168 E. 38th st.
Bickel, Otto, 701 Madison ave.
Bishop, Edward A., 386 Audubon ave.
Birkhahn, Alex. M., 302 Central Park West.
Blakeslee, Geo. W., 157 W. 93d st.
Bluhm, M. M., 965 Tiffany st., Bronx.
Blum, Richard, 576 Fifth ave.
Blum, Theodor, 576 Fifth ave.
Bogue, Edward A., 63 W. 48th st.
Bogue, Fred L., 63 W. 48th st.
Bourne, A. R., 174 W. 79th st.
Bowman, Harry, 108 E. 73d st.
Brandt, Henry, 200 W. 113th st.
Brash, W. W., 1554 Broadway.
Brazill, Manuel J., 2090 7th ave.
Brazier, R. H., 125 E. 24th st.
Breen, John M., 115 E. 17th st.
Brice, Jas. H., 144 E. 19th st.
Brophy, Chas. J., 3456 Broadway.
Browne, Chas. L., 200 W. 57th st.
Brown, Irving W., 260 W. 71st st.
Brown, M. Hart, 1511 E. Chester rd.
Brush, F. C., 1181 Broadway.
Bryer, Russell K., 515 Madison ave.
Buckley, John T., 272 Willis ave.
Bunker, Jane G., 184 Joralemon st., Brooklyn.
Burke, J. Willard, 246 Fifth ave.
Burns, Bert A., 51 E. 42d st.
Burt, John D., 40 E. 41st st.
Burton, I. G., 1183 Broadway.
Butler, E. Santley, 576 Fifth ave.
Buxbaum, A. I. F., 331 Madison ave.
Byers, J. M., 303 Fifth ave.
Carleton, S. S., 171 W. 71st st.
Carman, Herman F., 343 E. 142d st.
Campbell, Guy, 253 Columbus ave.
Carney, Matthew F., 51 E. 42d st.
Carr, Wm., 560 Fifth ave.
Carrabine, Oscar, 542 Fifth ave.
Chase, O. J., Jr., 17 E. 38th st.
Chayes, Herman E. S., 576 Fifth ave.
Chicherio, F. A., 235 W. 129th st.
Cloney, Thos. F., 28 W. 39th st.
Clayton, Walter H., 423 W. 120th st.
Cloud, Agnes D., 449 W. 23d st.
Cohen, Bernhard, 315 Fifth ave.
Colburn, M. L., 600 W. 157th st.
Colburn, Walter H., 176 W. 72d st.
Cole, C. Monford, 106 E. 57th st.
Cole, J. P., Dobbs Ferry, N. Y.
Collins, Martin L., 2001 Fifth ave.
Concklin, Edward F., 44 E. 64th st.
Converse, J. S., 42 W. 40th st.
Cowles, Ward H., 1993 Boston Road.
Cotton, Waite A., 3750 Broadway.
Crookshank, F. A., 849 E. 156th st.
Cudlipp, Edwin, 167 W. 71st st.
Currie, Alex. W., 40 E. 41st st.
Dailey, Wilber M., 19 E. 69th st.
Dailey, Washington, 667 Madison ave.
Danforth, A. G., 55 W. 39th st.
Davenport, R. M., 51 W. 47th st.
Davenport, Sebert E., 51 W. 47th st.
Davenport, Sebert E., Jr., 51 W. 47th st.
Deane, Harry T., 616 Madison ave.
Deane, Wm. C., 616 Madison ave.
Degenhardt, M., 230 W. 97th st.
Degenhardt, Wm. F., 1125 Lexington ave.
Delaney, John T., 1378 Lexington ave.
Deschler, Geo. L., 38 E. 61st st.
De Sola, S., 333 Central Park West.
De Wolfe, Edward R., 1730 Broadway.
Dickinson, J. W., 542 Fifth ave.
Dills, Wm. B., 140 W. 57th st.
Dixon, Edwin H., 40 E. 41st st.
Doxtater, L. W., 675 Madison ave.
Draper, Wm. H., 11 E. 48th st.
Dunning, Henry S., 17 E. 38th st.
Dunning, Wm. B., 140 W. 57th st.
Durschang, A. C., 321 E. 17th st.
Easton, B. A., 66 Market st., Poughkeepsie, N. Y.
Eddy, G. M., 618 Fifth ave.
Elster, Robert E., 201 W. 108th st.
Emerson, C. H., 167 W. 71st st.
Epstein, Michael, 15 W. 44th st.
Erganian, J. K., 175 Fifth ave.
Evans, Harry P., 44 E. 64th st.
Evans, George, 55 W. 39th st.
Fairchild, Beatrice C., 23 E. 126th st.

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Ferris, Henry C., 140 W. 57th st.
Fischer, Edward W., 202 W. 74th st.
Fisher, Wm. C., 373 Fifth ave.
Fletcher, Cecil G., 527 Fifth ave.
Fletcher, C. R., 167 W. 71st st.
Force, Willard B., 576 Fifth ave.
Fossume, Finn L., 616 Madison ave.
Fox, Edward, 252 W. 79th st.
Freedman, Anna G., 275 Central Park West.
Francis, W. E., 47 W. 34th st.
Franken, Sigmund W., 36 E. 40th st.
Fulton, John G., 116 W. 59th st.
Gardner, Walter H., 1271 Broadway.
Gates, Albert W., 606 W. 116th st.
Getz, Forry R., 576 Fifth ave.
Getzoff, Samuel M., 33 W. 42d st.
Gibbs, John R., Jr., 149 Broadway.
Gibson, Kasson C., 115 W. 77th st.
Gies, Carl J., 315 E. 86th st.
Gillett, Henry W., 140 W. 57th st.
Gluck, Ernest, 152 E. 111th st.
Goldberg, Harry A., 2 W. 86th st.
Goode, Gladstone, 576 Fifth ave.
Gottschaldt, Martin C., 40 E. 41st st.
Grace, Thomas M., 167 W. 71st st.
Green, Leo, 44 E. 75th st.
Greenbaum, Leo, 741 Fifth ave.
Griffin, Francis D., 164 W. 73d st.
Gross, Samuel, 371 E. 198th st.
Gunn, Andrew H., 40 E. 41st st.
Gunton, L. M., 40 E. 41st st.
Haas, Arthur, 911 Park ave.
Haigh, Herbert, 329 Amsterdam ave.
Hammer, H. F., 69 E. 55th st.
Hargett, Arthur V., 2016 Seventh ave.
Hart, Harriette, 142 W. 71st st.
Hartman, Wm. N., 167 W. 71st st.
Harvitt, Joseph, 214 E. Broadway.
Hasbrouck, Jas. F., 40 E. 41st st.
Hasbrouck, J. Roswell, 171 W. 71st st.
Hassell, Samuel W., 118 W. 71st st.
Hassinger, J., 435 W. 146th st.
Heckard, Wm. A., 489 Fifth ave.
Heinzer, Edward A., Amsterdam ave. & 99th st.
Heller, Chas. A., 171 E. 116th st.
Hellman, Milo, 40 E. 41st st.
Herbert, Wm. C., 576 Fifth ave.
Herbst, Max, 4 New Chambers st.
Herzog, Jerome, 54 E. 93d st.
Hess, Samuel, 818 Lexington ave.
Higgins, John H., 43 E. 25th st.
Hill, D. A., 1295 Fulton ave, Bronx.
Hills, Wm. B., 307 E. 18th st.
Hlavac, Chas. W., 240 E. 69th st.
Hoag, Wm. J., 527 Fifth ave.
Hobby, G. W., 167 W. 71st st.
Hoblitzell, C. M., 431 Convent ave.
Holdridge, P. A., 157 W. 79th st.
Houston, H. C., 69 Sixth ave.
Howe, Frank Morgan, 113 E. 60th st.
Howells, Edwards W., 31 W. 47th st.
Hull, Geo. A., 123 W. 73d st.
Hull, Henry J., 40 E. 41st st.
Hussa, Philip, 40 E. 41st st.
Hutchinson, R. G., Jr., 11 E. 48th st.
Hyland, J. D., 255 W. 44th st.
Igel, Victor, 420 Albemarle Road, Brooklyn.
Ireland, Alice J., 44 W. 47th st.
Irving, Wm. W., 40 E. 41st st.
Jackson, Victor H., 40 E. 41st st.
Jenkins, G. R., 40 E. 41st st.
Jernigan, Geo. F., 61 W. 56th st.
Jones, Lawrence H., 2 Wall st.
Kaemmerer, Henry A., 1130 Fox st.
Karmiohl, Jacob, 340 E. 72d st.
Kaplan, Emanuel M., 136 Liberty st.
Kauffer, H. J., 112 W. 72d st.
Keith, Ross H., 185 Madison ave.
Kelley, Frank J., 576 Fifth ave.
Kelly, O. R., 200 W. 72d st.
Kelsey, Ernest A., 2001 Fifth ave.
Kemple, Frederick C., 576 Fifth ave.
Kennard, Louis W., 542 Fifth ave.
Kennedy, Clement D., 119 E. 60th st.
Kennedy, Edw., 347 Fifth ave.
Kessler, Sam'l J., 528 W. 111th st.
Kimball, C. Denney, 40 E. 41st st.
Kimball, Chas. Otis, 40 E. 41st st.
Knecht, Wm. D., 40 E. 41st st.
Kohn, Alfred L., 111 W. 118th st.
Krows, Earl, 126 W. 126th st.
Kreisler, David, 95 W. 119th st.
Lambert, H., 122 E. 74th st.
Lang, Joseph, 116 W. 59th st.
La Roche, Montgomery, 704 Madison ave.
Lazarnick, L. L., 255 W. 88th st.
Lederer, Wm. J., 150 E. 74th st.
Leggett, Geo. H., 133 W. 123d st.
Lekowski, Victor, 207 E. 15th st.
LeRoy, Louis C., 38 W. 50th st.
Lester, Wm. B., Park Row Building.
Levy, Joseph M., 1277 Madison ave.
Liebrecht, Chas. F., 203 W. 81st st.
Lindsay, Elmer A., 36 E. 40th st.
Lindsay, Harley B., 40 E. 41st st.
Linton, Chas. C., 40 E. 41st st.
Litten, Arthur S., 238 W. 78th st.

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Locherty, Jas. B., 109 W. 45th st.
Lowenstein, Julius, 971 Second ave.
Lowenstein, M. S., 2 W. 94th st.
Ludington, Robert B., 40 E. 41st st.
Lyke, J. Hyatt, 242 Lenox ave.
MacKnight, Thos. S., 63 W. 48th st.
McCormick, Herbert V., 26 Cortlandt st.
McGrath, S. W., 321 E. 17th st.
McKenzie, James, Jr., 57 W. 84th st.
McLaren, Francis J., 127 W. 48th st.
McNaughton, Stuart A., 63 W. 49th st.
McNeille, Chas. S., 500 Fifth ave.
McNeille, Perry, 500 Fifth ave.
Macdonald, Wm. D., 576 Fifth ave.
Madsen, M. P., 201 W. 94th st.
Mann, Joseph, 317 Second ave.
Manney, G. A., 101 E. 92d st.
Manville, Geo. P., 576 Fifth ave.
Marco, B. Barrymore, Hotel Ansonia.
Marshall, H. G., 144 W. 126th st.
Mattes, Otto, 241 W. 14th st.
Matteson, George E., 150 W. 104th st.
Meeker, John B., 253 W. 85th st.
Mehlig, Carl F. C., 527 Fifth ave.
Merritt, Arthur H., 59 W. 46th st.
Metzger, Otto I., 135 Central Park West.
Meyer, John H., 161 W. 71st st.
Miller, Alonzo B., 542 Fifth ave.
Miller, Arthur, 2880 Broadway.
Minner, Edmund E., 144 W. 92d st.
Mishnun, Harry, 601 W. 137th st.
Mitchell, Vethake E., 17 E. 38th st.
Mobley, Lewis K., 46 W. 51st st.
Monroe, Thos. H., 437 Fifth ave.
Moolten, Raphael J., 13 Astor Place.
Mork, Waldo H., 2091 Washington Place.
Morse, Daniel E., 1068 Lexington ave.
Moss, Michael L., 307 E. 86th st.
Nagel, Harold, 228 Audubon ave.
Nash, Benj. C., 143 W. 81st st.
Nash, Lewis, 17 E. 38th st.
Newgarden, Charles, 564 W. 160th st.
Nickerson, Ernest W., 101 W. 72d st.
Niles, F. B., 2139 Seventh ave.
Noll, Joseph A., 501 W. 138th st.
Northrop, H. W., 546 Fifth ave.
Nyce, Justin E., 306 E. 35th st.
O'Brian, L. A., 542 Fifth ave.
Ogden, Harry B., 130 W. 57th st.
Onderdonk, Thos., 542 Fifth ave.
Ottolengui, R., 80 W. 40th st.
Palmer, Bissell B., 220 W. 98th st.
Palmer, Bissell B., Jr., 40 E. 41st st.
Palmer, Corydon, 231 W. 97th st.
Palmer, Delos, 48 W. 50th st.
Palmer, Geo. B., 40 E. 41st st.
Parker, Horace J., 40 E. 41st st.
Paymer, Edw., 308 E. 79th st.
Paulsen, M. A., 2041 Fifth ave.
Paulsen, A. F., Tremont and Park aves.
Pease, J. Grant, 61 W. 74th st.
Peeso, Fred A., 542 Fifth ave.
Perez, José G., 315 Fifth ave.
Perkins, Bertram R., 40 E. 41st st.
Peters, August L., 125 E. 64th st.
Peters, Henry H., 260 W. 72d st.
Peters, John L., 133 W. 72d st.
Phillips, Henry H., 1722 Aeolian Hall.
Polhamus, Agnes I., 98 Morningside ave.
Pratt, F. W., 46 W. 51st st.
Prensky, Wm. S., 507 Fifth ave.
Prentiss, Elias B., 130 W. 57th st.
Price, Sherman B., 24 E. 48th st.
Quendenfeldt, Paul B. H., 570 Bergen ave.
Rabell, Chas. Francis, 40 E. 41st st.
Randolph, W. F., 1328 Broadway.
Ranhofer, Edward J., 65 W. 70th st.
Rathfelder, G. C., 300 W. 107th st.
Raymond, E. H., Jr., 542 Fifth ave.
Reed, J. Howard, 120 W. 87th st.
Refsum, Joseph, 715 Madison ave.
Reitz, Ralph B., 576 Fifth ave.
Remington, Frank A., 57 W. 49th st.
Requa, J. Eugene, 616 Madison ave.
Rettich, Hugo, 52 W. 68th st.
Rhein, M. L., 38 E. 61st st.
Rice, Geo. E., 24 E. 48th st.
Richardson, C. C., 292 W. 92d st.
Riggs, Wm. D., 24 E. 48th st.
Rivinius, Julius W., 173 W. 73d st.
Robinson, Edwin S., 28 W. 39th st.
Ros, Osvaldo, 452 Fifth ave.
Rosenbaum, Wm., 219 W. 86th st.
Rosalsky, Harry W., 230 W. 97th st.
Root, John C., 24 E. 48th st.
Rothkranz, Wm. C., 45 W. 34th st.
Rouse, Arthur G., 576 Fifth ave.
Roy, Harold E., 527 Fifth ave.
Rubricius, Frank I., 217 E. 72d st.
Rubsam, Chas. W., 140 W. 57th st.
Ruyl, J. P., 40 E. 41st st.
Ryan, E. P. R., 452 Fifth ave.
Salsbury, Henry L., 120 W. 86th st.
Salvatore, Victor P., 499 E. 139th st.
Schamberg, Morris I., 116 W. 59th st.
Schiff, Wm. G., 231 W. 125th st.
Schmidt, Karl E., 170 Fifth ave.
Schnaper, Samuel, 860 Lexington ave.

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Schwamm, Henry, 174 E. 74th st.
Schwarz, Frederick J., 261 W. 21st st.
Scobey, Harry C., 116 W. 59th st.
Scott, Charles F., 17 E. 38th st.
Senior, Eugene, 333 Central Park West.
Shaw, Geo. M., 40 E. 41st st.
Sheckter, Samuel J., 1849 Madison ave.
Sherry, Ernest, 301 W. 109th st.
Shields, Nelson T., 61 W. 56th st.
Short, Wm. B., 176 W. 72d st.
Simon, Samuel, 794 Lexington ave.
Sinnigen Walter C., 560 Fifth ave.
Skalmer, M., 124 E. 95th st.
Skidmore, J. L., 250 W. 74th st.
Smith, Edward C., 17 E. 38th st.
Smith, Fred E., 66 W. 49th st.
Smith, F. Milton, 63 W. 48th st.
Smith, Karl C., 576 Fifth ave.
Solow, L. J., 33 W. 42d st.
Spencer, H. W., 437 Fifth ave.
Spengeman, Percy G., 400 W. 152d st.
Stack, Wm. H., 488 Tremont ave.
Stanley, Rolof B., 11 E. 48th st.
Stanton, Fred'k L., 28 W. 39th st.
Stark, A. Burton, 505 Fifth ave.
Starr, Alfred Russell, 10 E. 92d st.
Steeves, S. A., 33 W. 42d st.
Stein, Gustave R., 144 W. 123d st.
Stern, Henry G., 3671 Broadway.
Stern, Leo, 924 West End ave.
Stewart, Howard T., 51 E. 42d st.
Stier, Julius J., 226 W. 78th st.
Stillman, Paul R., 115 Broadway.
Stoney, Arthur C., 515 Madison ave.
Strance, A. G., 315 Central Park West.
Strauss, Milton A., 2412 Seventh ave.
Strohmeyer, Joseph J., 167 W. 71st st.
Strong, Irving E., 1059 Tinton ave.
Sutherland, Arnold H., 28 W. 39th st.
Sweetser, R. W., 18 W. 34th st.
Swift, Arthur L., 140 W. 57th st.
Swift, Thomas, 1 Park ave., Mt. Vernon, N. Y.
Sylla, E. W., 1271 Broadway.
Taggart, Rob't N., 330 Alexander ave.
Taylor, C. S., 102 W. 93d st.
Taylor, J. Ostram, 592 E. 165th st.
Taylor, James W., 106 E. 57th st.
Taylor, Herbert W., 58 W. 50th st.
Terrell, Geo. B., 40 E. 41st st.
Terry, Winfield C., 140 E. 92d st.
Thompson, Daniel B., 214 W. 71st st.
Throop, Harold M., 140 E. 92d st.
Tomlinson, Edward S., 40 E. 41st st.
Tooley, Francis L., 157 E. 79th st.
Tousey, Sinclair, 140 W. 57th st.
Tracy, Martin C., 46 W. 51st st.
Tracy, Wm. Dwight, 46 W. 51st st.
Trattner, Henry, 171 E. 81st st.
Turcot, F. G., 546 Fifth ave.
Turner, Frederick C., 505 Fifth ave.
Turner, W. J., 19 W. 54th st.
Tyrrell, Wm. Bell, 521 W. 111th st.
Van Saun, S. W., 250 W. 74th st.
Van Winkle, W. T., 59 W. 46th st.
Vaughan, Harold S., 616 Madison ave.
Vaughan, Ray G., 11 E. 48th st.
Vetter, Charles, 2 W. 88th st.
Vuilleumier, J. A., 58 E. 58th st.
Waddell, R. W., 45 W. 34th st.
Wald, Armin, 323 E. 86th st.
Walker, Wm. Wallace, 58 W. 50th st.
Walker, Alfred S., 38 W. 59th st.
Wardwell, Claison S., 576 Fifth ave.
Watson, John Russell, 576 Fifth ave.
Webster, William Lloyd, 101 W. 78th st.
Weed, Thos. M., 464 W. 145th st.
Wehrenberg, W. D., 2131 Broadway.
Weinberger, B. W., 40 E. 41st st.
Weld, Geo. W., 16 E. 23d st.
Westbay, Henry E., 219 W. 71st st.
Wheeler, C. W. B., 17 E. 38th st.
Wheeler, Herbert L., 560 Fifth ave.
Wheeler, Isaiah N., 60 W. 51st st.
White, John E., 1328 Broadway.
White, W. D., Jr., 331 Madison ave.
Whitlock, W. Melvin, 11 E. 48th st.
Whitney, Edward P., 54 W. 48th st.
Willcox, Harry, 516 Fifth ave.
Willis, Geo. P., 949 Lexington ave.
Wilson, Geo. A., 542 Fifth ave.
Wilson, Geo. A., Jr., 33 W. 42d st.
Wilson, Lawton H., 576 Fifth ave.
Wolff, Alexander, 141 E. 34th st.
Wollison, R. M., 576 Fifth ave.
Wright, Chas. D., 57 W. 50th st.
Young, J. Lowe, 576 Fifth ave.
Zentler, Arthur, 527 Fifth ave.
Zimmerman, G. H., 167 W. 93d st.
Zweig, Jacob, 115 W. 119th st.

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Second District.

THE annual meeting of the Second District Dental Society of the State of New York was held April 12, 1915, and the following persons were elected officers for the ensuing year:

President—W. N. Frazer.
Vice-president—Wm. H. Rogers.
Recording Secretary—Fred O. Kraemer, Jr.
Corresponding Secretary—W. S. Watson.
Treasurer—C. M. Norcom.
Librarian—T. A. Quinlan.
State Dental Examiner—F. C. Walker.
Members of Executive Council—H. P. Gould (regular), W. N. Frazer (alternate).

The following were elected to serve on State Society Committees: R. Ottolengui (Law); F. O. Kraemer (Legislative); A. H. Stevenson and H. C. Croscup (Oral Hygiene).

During the past year the Second District Society has held seven meetings, at all of which essays were read, although two were announced as business meetings. The annual meeting was held April 12, 1915, at the Bossert Hotel, Brooklyn. This meeting was a big success, owing to the fact that it comprised a business meeting, followed by a dinner, at which two hundred members and guests assembled, and a paper was read by Dr. Elmer S. Best of Minneapolis, Minn.

Papers read during the year were by the following: "Desensitizing Paste, a New, Safe and Reliable Remedy for Hypersensitive Dentin," by J. P. Buckley of Chicago, Ill. "The Technique and Treatment of Pulp Cavities," by Leuman M. Waugh of New York. Dr. H. G. Dunning showed a motion picture film, demonstrating the technique of Fischer's conductive anesthesia. Dr. C. C. Voelker read a paper and demonstrated a simple apparatus for the therapeutic use of radiant heat and blue light as an adjunct in pyorrhea treatment and other dental disorders. "The Dental Hygienist in Public Institutions," by A. C. Fones of Bridgeport, Conn. "Definite Occlusion in Porcelain Restoration," by Albert Leland Legros of Detroit, Mich. "A Root-canal Preparation," by R. J. Callahan of Cincinnati, Ohio. "The Responsibility of the Dentist in Relation to Pulpless Teeth," by Elmer S. Best of Minneapolis.

The society increased its membership by thirty-two new active members, one life member—Dr. P. L. Hull, and one honorary member—Dr. Chas F. Ash.

Dr. D. A. Fuller of Brooklyn died May 2, 1915.

Respectfully submitted,

FRED O. KRAEMER, JR., *Rec. Sec'y.*

ACTIVE MEMBERS.

(*Resident in Brooklyn unless otherwise specified.*)

Adams, F. R., 861 Manhattan ave.
Allen, C. C., 105 Clinton st.
Allen, N. H., 444 Franklin ave.
Allyn, F. L., Woodhaven, L. I.
Arvine, F. B., 793 Lincoln Place.
Ayers, Herbert D., 93 Amity st., Flushing, N. Y.
Babcock, E. H., 184 Joralemon st.
Babcock, L. H., 2118 Beverly Road.
Bade, Henry, 136 Halsey st.
Barker, D. W., 87 Lafayette ave.
Barnes, F. D., 178 Stuyvesant ave.
Bartlett, H. M., 945 Park Place.
Bauer, August F., 154 Nassau st., N. Y. C.
Bauer, W. C., 1116 Bushwick ave.
Boley, J. M., 11 Weirfield st.
Beissel, William J., 1004 Broadway.
Berendsohn, E. H., 204 Berkeley Place.
Berendsohn, W. A., 598 Carlton ave.
Bornman, Carl F., 67 Hanson Place.
Boudin, Anna P., 477 E. 16th st.
Boylhart, Fred'k H., 129 St. Felix st.
Brown, Byron, 77 Hanson Place.
Brown, J. B., 80 Lafayette ave.
Buchenholz, Ira, 258 Hart st.
Buckley, W. A., Liberty, N. Y.
Burgess, F. L., Huntington, L. I.
Bush, W. N., 183 Halsey st.
Bush, C. A., 126 Hancock st.
Campbell, D. K., 436 Gold st.
Carpenter, Walter Titus, 191 Ryerson st.
Chambers, E. J. C., 280 Flatbush ave.
Childs, Henry M., 67 Hanson Place.
Clark, Robert H., 350 Carlton ave.
Clark, W. G., 103 Montague st.
Clark, W. P., 26 Seventh ave.

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Clasing, J. F. W., 283 President st.
Clayton, Furman, 469 Franklin st.
Coe, Thomas C., 508 E. 5th st.
Cook, Frank W., 44 Court st.
Cook, J. D., 81 Reid ave.
Croscup, H. C., 327 Sterling Place.
Crossman, Victor W., 136 Fort Greene Place.
Cuinet, L. A., 152 Henry st.
Cuneo, C. N., 2118 Beverly Road.
Davis, George E., 1612 Broadway.
Dayton, C. R., 488 Nostrand ave.
Deale, W. H., Babylon, L. I.
De Bar, William, 260 Ovington ave.
Desnoes, A. M., 488 Nostrand ave.
Dills, W. B., 140 W. 57th st., N. Y. C.
Douglass, George Crawford, 540 Putnam ave.
Dunlop, C. H., 145 Halsey st.
Easley, Shirley H., 977 Jefferson ave.
Edwards, LeRoy S., 113 S. Elliott Place.
Engel, P. B., 10 Stuyvesant ave.
Engel, W. F., 10 Stuyvesant ave.
Ewald, Martha R., 1211 Avenue N.
Ferris, H. C., 67 Hanson Place.
Filler, Julius, 68 McKibben st.
Finney, J. H., 333 McDonough st.
Fischler, Bernard, 120 Reid ave.
Frazer, Wm. N., 184 McDonough st.
Fuller, Z. P., 110 S. Elliott Place.
Gardner, G. W., 184 Joralemon st.
Gelson, J. Norbert, 282 Park Place.
Gessell, H. R., 709 Manhattan ave.
Gilcrest, H. C., Nyack, N. Y.
Gilman, R. E., 33 Lafayette ave.
Glenzer, J. A., 593 Hancock st.
Glover, B. W., 34 Clarkson st.
Goldberger, W. M., 1932 Bergen st.
Gomer, Charles A., 770 Willoughby ave.
Gough, F. A., 184 Joralemon st.
Gould, Horace P., 181 Joralemon st.
Green, H. C., 228 Cumberland st.
Greismer, M. F., 364 McDonough st.
Gunton, Leonard M., 40 E. 41st st., N. Y. C.
Haas, H., 240 Covert st.
Haley, J. F., 840 Herkimer st.
Halsey, W. E., 203 Jefferson ave.
Hamlet, F. P., Hempstead, L. I.
Hankinson, M. C., 201 Schermerhorn st.
Hanning, J. H., 1085 E. 18th st.
Harby, R. D., 792 Lincoln Place.
Held, John W., 826 Rogers ave.
Heilig, S. E., 280 Flatbush ave.
Herman, Leo, 4721 12th ave.
Hesse, Carl G., 1159 Broadway.
Hillyer, Ellison, 1143 Dean st.
Hoch, B. L., 130 Reid ave.
Holbrook, E. A., 148 Hancock st.
Holch, H. G., 155 Gates ave.
Holmboe, Birger, 162 Montague st.
Holmes, J. H., 107-a Halsey st.
Holzman, M. P., 1024 Bushwick ave.
Hopkins, S. P., 184 Joralemon st.
Hunter, Arthur M., 67 Hanson Place.
Husch, Jacob, 269½ Vernon ave.
Huschman, H. S., Port Richmond, N. Y.
Huskinson, Ernest C., 1246 Pacific st.
Hyatt, T. P., 17 E. 38th st., N. Y. C.
Jarvie, Wm., 19 W. 54th st., N. Y. C.
Joffe, Maxwell S., 72 Manhattan ave.
Johnson, A. S., 1203 Dean st.
Johnston, Will H., 35 Ft. Greene Place.
Kaletsky, C. Myron, 297 Fulton st., Jamaica, L. I.
Kalkbrenner, C. E., 2328 Myrtle ave.
Keowen, S. S., 24 New York ave.
Keppy, F. B., 62 Hancock st.
Ketcham, F. S., 141 Hancock st.
King, Horace W., 85 Main st., Flushing, L. I.
Knight, G. W., 28 Cambridge Place.
Knox, John T., 184 Joralemon st.
Kohn, Leonard, 184 Cornelia st.
Koob, Joseph J., 401 Grove st.
Kraemer, F. O., 225 Schermerhorn st.
Kraemer, F. O., Jr., 225 Schemerhorn st.
Kregeloh, H. A., 170 N. 6th st.
LaBorne, Chas H., 792 Nostrand ave.
Lanchantin, E. F., 360 Ninth st.
Lando, Samuel A., 27 Grand ave., Corona, L. I.
Lawrence, A. L., 85 Main st., Flushing, N. Y.
Lawrence, W. E., 1 Revere Place.
Lehmann, E., 194 Ridgewood ave.
Leif, J. F., 12 Graham ave.
Leonard, M. D., 854 Flatbush ave.
Leonard, R. G., 854 Flatbush ave.
Leprohon, J. B., 105 Quincy st
Lewis, J. M., 50 Lenox Road.
Lewis, Warrington G., 184 Joralemon st.
Lienau, R. C., 137 Bainbridge st.
Long, Orville S., 781 Ocean ave.
Lundgren, C. J., 1241 Broadway.
Mac Donald, C. F., 154 Clinton st.
Machat, B. B., 8679 20th ave.
Malcolm, James A., Oyster Bay, L. I.
Mapp, C. J., 44 Court st.
Marks, Edward A., 442 Kosciusko st.
Marshall, E. W., 144 Park Place.
Master, C. M., Flushing, L. I.
Master, E. A., 181 Joralemon st.

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Matt, O. T., 696 Park Place.
McAteer, J. L., 4426 18th ave.
McCushing, G. J. B., 3013 Jamaica ave.
McNeill, E. W., 65 St. Johns Place.
Megaw, Elmer E., 1166 Dean st.
Merwin, R. E., 796 Carroll st.
Michnoff, S. J., Bay Shore, L. I.
Miller, Frank Henry, 310 Cumberland st.
Miller, F. H., 562 Bainbridge st.
Miller, Irving U., 284 Henry st.
Mogk, Wm. C., 223 St. Nicholas ave.
Morris, Frank, 1151 Dean st.
Morris, W. A., 657-a Macon st.
Morrison, E. V., 67 Hanson Place.
Muth, George H., 1124 Ocean ave.
Newton, H. A., 151 Clinton st.
Nies, Frederick H., 79 Hamilton ave.
Nodine, A. M., 1 W. 34th st., N. Y. C.
Norcom, C. M., 1187 Bergen st.
O'Brien, H. L., 104 Prospect Park West.
O'Connell, M. F., Corona, N. Y.
Orr, C. W., 100 Hanson Place.
Orth, F. C., 612 Benedict ave., Woodhaven.
Ottolengui, R., 80 W. 40th st., N. Y. C.
Paaswell, Benjamin, 974 St. Marks ave.
Parker, Clinton B., 154 Clinton st.
Parker, DeWitt L., 178 State st.
Parker, Douglas B., 154 Clinton St.
Parker, V. F., 124 Montague st.
Pensak, Julius, 1476 Pitkin ave.
Perlie, H. E., 1417 G st., N. W., Washington, D. C.
Peterson, J. O., 216 Bergen st.
Peterson, Theodore O., 429 Bergen st.
Phillips, P. J., 129 S. Oxford st.
Powell, J. K., Jr., 175 Hancock st.
Provost, W. D., 80 Lafayette ave.
Quackenbush, Hattie W., 473 Washington ave.
Quinlan, J. S., 76 6th ave.
Quinlan, T. A., 463 Fulton st.
Quinn, A. M., 16 Seventh ave.
Ralph, Ed. D., 11 Yale ave., Jamaica, N. Y.
Reese, R. H., 103 Macon st.
Riggs, W. C., 67 Hanson Place.
Rippier, E. T., 354 Ninth st.
Ritt, Adolph, 1621 Pitkin ave.
Rogers, W. H., 506 Hancock st.
Rosenthal, A. D., Hempstead, N. Y.
Royce, F. C., 65 Greene ave.
Russell, J. W., 6 Plaza st.
Ruyl, J. P., 18 Ashford st.
Sanbern, Frank, 184 Joralemon st.
Sanderson, R. H., 76 Rogers ave.
Sandhusen, George, 298 Cumberland st.
Sandiford, H. E., 73 St. Marks ave.
Scammon, H. L., Riverhead, N. Y.
Scheiner, Karl, 1829 Gates ave.
Schmidt, J. A., 1195 Dean st.
Schreiber, G. J., 758 Flushing ave.
Schumacher, Frank H., 1307 Bushwick ave.
Scofield, F. E., 87 Macon st.
Scofield, W. L., Brewster, N. Y.
Seaver, A. D., 134 Park Place.
Sexton, E. K., 632 Throop ave.
Seyfarth, G. E., 17 Palmetto st.
Shankroff, Louis, 343 Jefferson ave.
Shapiro, Benjamin, 1480 Eastern Parkway.
Shapiro, Benjamin D., 1808 Prospect Place.
Shapiro, Jacob, 430 Stone ave.
Shapiro, Simon, 430 Stone ave.
Shea, Bernard F., 324 Stuyvesant ave.
Shields, J. S., 585 Jefferson ave.
Shuayerson, Sam'l, 61 Tompkins ave.
Siqueland, Theo., 67 Hanson Place.
Sloman, John J., 731 Hancock st.
Small, E. W., 1571 Broadway.
Smith, Charles E., Mineola, L. I.
Smith, Dwight L., Far Rockaway, L. I.
Snyder, L. A., 108 S. Portland ave.
Solomons, J. R., 1 W. 34th st., N. Y. C.
Staats, George E., 1718 Macon st.
Steinbuch, Wm., 940 Bushwick ave.
Stevenson, A. H., 1619 Cortelyou Road.
Stillman, E. E., 178 Prospect Park West.
Stillman, J. C., 184 Joralemon st.
Stoltze, V. A., 537 Bedford ave.
Strong, W. A., 214-a Livingston st.
Sullivan, J. E., 360 Tompkins ave.
Sullivan, W. F., 60 Broadway, N. Y. C.
Thompson, W. W., 383 Hancock st.
Toshack, E. W., 267 New York ave.
Turner, Wm. J., 19 W. 54th st., N. Y. C.
Tuttle, J. H., Jr., 184 Joralemon st.
Van Note, F. L., 512 Ocean ave.
Van Orden, Chas. A., 144 Lawrence st.
Van Woert, C. T., 184 Joralemon st.
Van Woert, F. T., 184 Joralemon st.
Voegtlen, P. G., 441 9th st.
Voelker, Charles C., 899 Union st.
Walker, F. C., 309 State st.
Wallace, E. C., 50 Macon st.
Warden, F. E., 242 McDonough st.
Warren, E. B., 11 Schenck ave.
Watson, Walter S., 5 McDonough st.
Webb, T. C., 8678 22d ave.
Weiskotten, R. H., 133 Hewes st.
Wengorovius, W. R., 35 W. 42d st., N. Y. C.
Whaley, E. G., 642 Park Place.

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Whitcomb, C. B., 148 Hancock st.
White, G. W., 309 13th st.
Wicks, J. V. P., 108 Fort Greene Place.
William, Maurice, 87 Norman ave.
Wolf, P. F., 1025 Bushwick ave.
Wolkin, Geo., 241 Euclid ave.
Wood, John, 38 Halsey st.
Woodle, J. M., 1024 Halsey st.
Wyckoff, J. R., 279 Madison st.
Zametkin, Joel M., 7724 14th ave.

HONORARY MEMBERS.

Ash, Chas. F., 115 Broadway, N. Y. C.
Goslee, H. J., Chicago, Ill.
Hutchinson, R. G., Jr., 11 E. 48th st., N. Y. C.
Jackson, V. H., 40 E. 41st st., N. Y. C.
Jenkins, N. S., Paris, France.
Taggart, W. H., Chicago, Ill.

LIFE MEMBERS.

Abbott, F. P., 33 Cambridge Place.
Emerson, F. S., 632 Bedford ave.
Holly, R. T., 155 Montague st.
Houghton, O. E., 126 S. Oxford st.
Hull, P. L., Jamaica, N. Y.
Parker, E. G., Goshen, N. Y.
Ramsdell, W. M., Oxford, Chenango Co., N. Y.

Third District.

THE annual meeting of the Third District Dental Society of the State of New York was held on April 17, 1915, and the following persons were elected officers for the ensuing year:

President—George Vanderpool, Albany.
Vice-president—Richard Ellis, Troy.
Recording Secretary—J. W. Canaday, Jr., Albany.
Corresponding Secretary—C. E. Allen, Albany.
Treasurer—P. S. Oakley, Troy.
Editor—F. F. Hawkins, Troy.
Members of Executive Council—J. W. Canaday, Sr. (regular), Albany, and F. F. Hawkins (alternate), Troy.

The following were elected to serve on State Society Committees: Morton Van Loan (Law); George Vanderpool (Legislative); M. J. Barrett and Leroy S. Blatner (Oral Hygiene).

During the year just ended we have been singularly fortunate in that we have not lost one old member by death.

Three men, Drs. Bookstein, Burke, and Scott, were dropped for non-payment of dues. At our annual meeting we elected twenty-four new members, due principally to the efforts of Dr. A. M. Wright of Troy, president of the State Society.

On April 18th, the day after our annual meeting, Dr. L. R. Whitney of Troy, one of our new members-elect, was killed in an automobile accident. Hence only twenty-three new members are reported on the active list.

Respectfully submitted,
J. W. CANADAY, JR., *Rec. Sec'y.*

ACTIVE MEMBERS.

Allen, C. E., 24 Dove st., Albany.
Ames, F. L., 64 Swan st., Albany.
Amyot, B. E., Cohoes.
Amyot, J. A., Cohoes.
Appleton, G. N., 5 Ten Broeck st., Albany.
Appleton, J. L., 522 Madison ave., Albany.
Barlow, G. F., Hudson.
Barrett, M. J., 1830 Fifth ave., Troy.
Behrens, H., Jr., Kingston.
Bennett, E. A., Catskill.
Betts, F. S., Kingston.
Bird, C. H., 59 Fourth st., Troy.
Bishop, C. H., Kingston.
Blatner, L. S., 346 State st., Albany.
Boudrias, Louis, Cohoes.
Brown, M. E., 90 State st., Albany.
Caddick, Geo., 53 Dove st., Albany.
Canaday, J. W., 283 State st., Albany.
Canaday, J. W., Jr., 283 State st., Albany.
Carter, C. D., Kingston.

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Carter, J. H., Cohoes.
Clarke, G. H., Kingston.
Conkling, W. A., Catskill.
Cragin, A. M., Kingston.
Cragin, C. B., Kingston.
Doyle, T. A., 157 Central ave., Albany.
Ellis, Richard, 54 Fourth st., Troy.
Englert, G. A., Catskill.
Fabyan, W. D., Philmont.
Fallon, H. C., 812 River st., Troy.
Fitzgerald, M. A., 99 N. Pearl st., Albany.
Fitzsimmons, J. A., 37 Central ave., Albany.
Gale, E. H., 90 State st., Albany.
Gale, L. J., 18 S. Pearl st., Albany.
Gallico, J. E., 40 Third st., Troy.
Harris, C. T., Hudson.
Hawkins, F. F., 95 Fourth st., Troy.
Herbert, O. N., Troy.
Hudson, W. A., 94 Washington ave., Albany.
James, L. R., Hudson.
Ketner, F. W., Hudson.
Kirwan, M. F., 31 Central ave., Albany.
Kittell, H. G., 620 Second ave., Troy.
Knapp, G. O., 41 Fourth st., Troy.
Knauff, E. J., 49 Third st., Troy.
Le Blanc, P. A., 32 N. Pearl st., Albany.
Levitas, S. T., Kingston.
Lynam, H. D., 351 Broadway, Troy.
McCarthy, W. E., 457 Broadway, Troy.
McCormack, E. P., 95 N. Pearl st., Albany.
McCormick, F. L., 46 Third st., Troy.
McCormick, J. J., 453 Broadway, Troy.
McKeon, F. J., 64 N. Pearl st., Albany.
Maby, E. R., Mechanicsville.
Mann, Josiah, Middleburgh.
Michael, R. C., 65 Fifth ave., Troy.
Michel, F. G., 52 N. Pearl st., Albany.
Murphy, Alice, Hoosick Falls.
Norton, A. J., Saugerties.
Oakley, P. S., 1647 Fifth ave., Troy.
O'Brien, F. D., 82 Swan st., Albany.
Perras, E. A., Troy.
Reynolds, S. S., 25 Central ave., Albany.
Rieger, A. B., Cohoes.
Rowe, M. L., 142 Washington ave., Albany.
Rowley, H. S., Hoosick Falls.
Scranton, S. A., Schoharie.
Stevens, W. E., Windham.
Sullivan, G. A., 18 Dove st., Albany.
Vanderpool, Geo., 90 State st., Albany.
Van Vleck, C. K., Hudson.
Van Loan, Morton, 82 Swan st., Albany.
Warren, W. A., Watervliet.
Weston, R. B., 355 State st., Albany.
Whitbeck, T. H., 44 Eagle st., Albany.
Wright, A. M., 4 St. Paul Place, Troy.
Young, E. J., 108 Third st., Troy.
Young, G. B., 78 Fourth st., Troy.

HONORARY MEMBERS.

Angle, Edw. H., New London, Conn.
McKay, Jos., Troy.
Shields, Nelson T., New York City.

LIFE MEMBERS.

Garvey, P. S., Hudson.
Nelson, H. G., Troy.

Fourth District.

THE annual meeting of the Fourth District Dental Society of the State of New York was held January 19, 1915, at Schenectady, and the following persons were elected officers for the ensuing year:

President—Wm. A. Mabie, Amsterdam.
Vice-president—Earl Timeson, Schenectady.
Secretary—Harry V. Gregg, Schenectady.
Correspondent—George Woolsey, Fonda.
Treasurer—O. J. Gross, Schenectady.
Librarian—(Sec'y).

State Dental Examiners (term to expire 1919)—O. J. Gross, Schenectady, and W. S. Rose, Schenectady.

Members of Executive Council—A. C. Rich (regular), Saratoga Spa, and L. A. Timerman (alternate), Fort Plain.

The following were appointed to serve on State Society committees: W. E. Snyder, (Law); E. B. Rhinehart (Legislative); A. S. Moore and L. A. Timerman (Oral Hygiene).

The following new members were elected at

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the annual meeting: Thos. P. McNulty, Harry C. Van Allen, C. E. Webster, Wm. R. Conner, G. P. Farmer, Herbert E. Vaughan, Henry H. Facteau, Rob't C. Hill, A. G. Kinum, Ralph Embler, Paul G. Maier, W. D. Rose, Clarence A. Finkle, R. Murnighan, Jos. F. Gaffney, Wm. C. Callahan, J. W. Joslin, Jr., Geo. A. Wilson, Fred F. Wakerly, and Arthur J. Cunningham.

Since the last report we have lost by death W. J. Williamson, Granville, and J. L. Sigsbee, Canajoharie.

Respectfully submitted,

HARRY V. GREGG, *Sec'y.*

ACTIVE MEMBERS.

Alexander, Wm. H., Johnstown.
Amyot, P. A., 525 State st., Schenectady.
Barraclough, J., Hudson Falls.
Brown, Geo., Glens Falls.
Carpenter, B. F., Whitehall.
Callahan, Wm. C., Johnstown.
Clark, F. P., Mechanicsville.
Coleman, S. E., Malone.
Colgrove, Wm. H., Johnstown.
Collins, J. A., Glens Falls.
Collins, J. H., Granville.
Conner, Wm. R., Gouverneur.
Cooney, T. S., 230 State st., Schenectady.
Cunningham, A. J., Warrensburg.
Day, F. C., Lake Placid.
Demarest, S. A., Glens Falls.
Embler, Ralph, 511 State st., Schenectady.
Facteau, Henry H., Tupper Lake.
Farmer, G. P., Gouverneur.
Fielding, F. A., Glens Falls.
Finkle, C. A., Amsterdam.
Foote, Leroy, Saratoga.
Foote, N. E., Whitehall.
Foulds, Thos. H., Glens Falls.
Gabler, L. C., 764 State st., Schenectady.
Gaffney, Jos. F., Amsterdam.
Garrett, W. L., Glens Falls.
Githens, W. L., Fort Edward.
Goetz, S. E. N., Lorraine Blk., Schenectady.
Gregg, H. V., 406 State st., Schenectady.
Grennan, F. T., 211 S. Center st., Schenectady.
Gross, O. J., 4 S. Church st., Schenectady.
Hastings, J. M., Saratoga.
Haynen, A. H., Glens Falls.
Hawley, A. T., Waterford.
Hill, Rob't C., 506 Crane st., Schenectady.
Hiney, G. H., Cambridge.
Hodder, C. A., Canajoharie.
Hull, J. B., 41 Front st., Schenectady.
Jackson, H. C., 243 State st., Schenectady.
Joslin, J. W., Jr., Johnstown.
Kinum, A. G., 463 State st., Schenectady.
Lord, C. N., 1005 State st., Schenectady.
McCann, A. H., Glens Falls.
McCullock, S. B., Gloversville.
McGillicuddy, D. F., Glens Falls.
McNulty, Thos P., Gouverneur.
Mabie, Wm. A., Amsterdam.
Maier, Paul G., 1318 State st., Schenectady.
Maloney, J. D., Hudson Falls.
Merrihew, P. P., Quaker st., Schd'y Co.
Moore, A. S., 150 Barrett st., Schenectady.
Munroe, J. A., Saranac Lake.
Murnighan, R., Amsterdam.
Petrie, R. C., Johnstown.
Powers, N. C., Saratoga.
Rhinehart, E. B., 617 Union st., Schenectady.
Rich, A. C., Saratoga.
Roach, Helen M., Glens Falls.
Roberts, D. S., Gloversville.
Rose, W. D., 162 Lafayette st., Schenectady.
Rose, W. S., 162 Lafayette st., Schenectady.
Sayre, R. D., Gloversville.
Shaw, E. D., Gloversville.
Sitterly, A. T., 160 Lafayette st., Schenectady.
Snyder, W. E., Amsterdam.
Steer, H. G., Fort Plain.
Ston, A. H., Salem.
Stowitts, H. M., Amsterdam.
Taylor, F. E., Malone.
Tibbetts, W. H., Ballston Spa.
Timerman, L. A., Fort Plain.
Timeson, Earl, 460 State st., Schenectady.
Van Allen, Harry C., Gouverneur.
Van Wie, P. B., Canajoharie.
Vaughan, H. C., Ogdensburg.
Wakerly, F. F., Westport.
Ward, G. E. T., 617 State st., Schenectady.
Wark, J. Finley, Corinth.
Webster, C. E., Gouverneur.
White, C. N., Granville.
Whitmyre, R. H., 606 Union st., Schenectady.
Wilson, Geo. A., Lake Placid.
Wilson, W. B., Saranac Lake.
Woolsey, Geo., Fonda.
Wright, Frank, Ticonderoga.
Yates, G. H., Fort Edward.

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HONORARY MEMBER.

Garrett, Jas. S., Glens Falls.

LIFE MEMBERS.

Doolittle, E., Schuylerville.
Rossiter, A. A., Saratoga.
Weed, P. W., Saratoga.

Fifth District.

At the annual meeting of the Fifth District Dental Society of the State of New York the following persons were elected officers for the ensuing year:

President—J. N. Garlinghouse, Clinton.
Vice-president—C. M. Ryan, Syracuse.
Recording Secretary—B. T. Mason, Fulton.
Corresponding Secretary—A. K. Osgood, Ilion.
Treasurer—E. R. Webb, 415 University Bldg., Syracuse.

The following were elected to serve on State Society committees: G. A. Potter (Law); T. R. Cullen (Legislative); R. F. Casler and W. F. Tremain (Oral Hygiene).

ACTIVE MEMBERS.

Barker, Wm. A., 800 University Building, Syracuse.
Barnes, C. H., 911 University Building, Syracuse.
Barrett, J. J., 515 Union Building, Syracuse.
Beach, G. B., 518 S. A. & K. Building, Syracuse.
Benz, J. C., 622 O. C. A. B. Building, Syracuse.
Bickelhaupt, A. C., 315 Kirk Building, Syracuse,
Billington, B. H., 2 Hendricks Building, Syracuse.
Bradshaw, C. A., 402 S. Salina st., Syracuse.
Butler, G. H., 715 University Building, Syracuse.
Capron, W. B., Utica.
Cary, Fred L., Fulton.
Carroll, J. F., 309 Kirk Building, Syracuse.
Casler, R. F., Watertown.
Cheney, Howard A., Watertown.
Clapp, H. M., Utica.
Clifford, W. D., 427 S. Salina st., Syracuse.
Coe, I. J., Baldwinsville.
Cooke, A. R., 815 University Building, Syracuse.
Craner, C. M., 902 University Building, Syracuse.
Cullen, T. R., Oswego.
Cummings, J. E., 513 O. C. A. B. Building, Syracuse.
Davis, C. H., Pulaski.
Davis, John L., 304 Dillaye Building, Syracuse.
Denny, F. P., Watertown.
Dommett, H. M., Ilion.
Dower, J. H., 427 University Building, Syracuse.
Earl, Fred W., Watertown.
Engle, W. F., Liverpool.
Eveleigh, E. J., 617–621 Onondaga Co. Bank Building, Syracuse.
Fisher, F. W., 415 Union Building, Syracuse.
Fowler, C. S., Watertown.
Garlinghouse, J. N., Clinton.
Gould, L. A., Watertown.
Gowland, W. G., 515 Kirk Building, Syracuse.
Grout, J. J., Skaneateles.
Guillaume, H. F., Utica.
Hall, J. S., 423 University Building, Syracuse.
Harrington, E. E., Watertown.
Head, G. T., 314 Dillaye Building, Syracuse
Heintz, Wm. J., Utica.
Hitzelberger, A. C., Utica.
Jones, R. E., 319 Union Building, Syracuse.
Jones, W. B., Remson.
Jones, Wm. H., Clinton.
Kelley, J. Otis, 325 Rosenbloom Building, Syracuse.
Kratzer, E. B., Baldwinsville.
Lafayette, A. M., 725 University Building, Syracuse.

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Markham, P. H., 912 University Building, Syracuse.
Mason, B. T., Utica.
McCraith, T. E., Utica.
Mills, F. L., Baldwinsville.
Mount, M. T., Cato.
Moyer, W. H., Baldwinsville.
Murray, W. G., Herkimer.
Neff, E. R., Carthage.
Orchard, H. S., Fulton.
Osgood, A. K., Ilion.
Parker, G. B., Watertown.
Perry, Geo. I., 318 Union Building, Syracuse.
Peters, C. J., 812 University Building, Syracuse.
Platner, L. W., Utica.
Potter, G. A., Cape Vincent.
Pritchard, J. T., Camden.
Redway, R. B., Ilion.
Retter, A., Utica.
Richards, C. W., Phoenix.
Roblin, H. M., 617 Onondaga Co. Bank Building, Syracuse.
Roth, G. S., 510 Gurney Building, Syracuse.
Ryan, C. M., 512 University Bldg., Syracuse.
Sayers, C. A., 514 Gurney Building, Syracuse.
Schamu, C. G., 702 University Building, Syracuse.
Shotthafer, Ed. A., Utica.
Slocum, Harold S., Oswego.
Slocum, Sheridan, Oswego.
Smith, A. F., 514 Union Building, Syracuse.
Smith, E. A., Rome.
Spriggs, C. J., Rome.
Stillman, A. A., Union Building, Syracuse.
Sullivan, J. C., Little Falls.
Talley, D. B., 714 Dillaye Building, Syracuse.
Tibbetts, F. S., Fayetteville.
Tompkins, H. H., Utica.
Tremain, W. F., Rome.
Turner, R. C., Oswego.
Webb, E. R., 415 University Building, Syracuse.
Wells, A. D., Skaneateles.
Wells, I. G., Holland Patent.
White, E. R., 718 S. A. & K. Building, Syracuse.
Wright, G. L., 212 W. Genesee st., Syracuse.

LIFE MEMBER.

Cherry, C. E., Syracuse.

Sixth District.

THE annual meeting of the Sixth District Dental Society of the State of New York was held March 26 and 27, 1915, and the following persons were elected officers for the ensuing year:

President—H. D. Whitmarsh, Binghamton.
Vice-president—E. J. Pritchard, Hancock.
Recording Secretary—Henry V. Heiss, Lestershire.
Treasurer—E. L. Pitcher, Cooperstown.

The following were appointed to serve on State Society Committees: F. A. Ford, (Law); W. J. LeSuer (Legislative); H. D. Whitmarsh and C. M. Dunne (Oral Hygiene).

The society has lost by death A. M. Holmes, Morrisville, July 31, 1914; M. D. Jewell, Richfield Springs, 1914; M. Hoffman Fish, New Berlin, 1914.

Respectfully submitted,
HENRY V. HEISS, *Rec. Sec'y.*

ACTIVE MEMBERS.

Anderson, Wm. T., Endicott.
Arbuckle, J. H., Delhi.
Axtell, G. F., Oneonta.
Barnes, A. S., Oneonta.
Barnett, John, Elmira.
Barton, W. W., Binghamton Savings Bank Building, Binghamton.
Bassett, C. G., Sidney.
Baylis, C. F., Oneonta.
Burdick, B. A., Homer.
Burghardt, H. D., Whitney Point.
Champlin, F. W., Oneida.
Chapman, B. O., Elmira.
Cowan, J. H., Cortland.

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Cox, C. W., Horseheads.
Crawford, J. R., Ithaca.
Cull, H. J., Cazenovia.
Cunningham, H. E., Hobart.
Crowley, A. J., Ithaca.
Darby, F. B., Elmira.
Decker, Geo. M., Owego.
Denike, G. A., Kilmer Building, Binghamton.
Dolan, B., Security Mutual Building, Binghamton.
Dunne, C. M., Norwich.
Faulkner, J. V., Oneida.
Fitch, H. E., Elmira.
Ford, F. A., Cazenovia.
Frisbie, J. D., Andes.
Garling, N. L., Ithaca.
Garvin, F. A., Oneida.
Gill, E. S., Morrisville.
Griswold, G. N., Unadilla.
Haase, F., Jr., Elmira.
Hamilton, H. B., Ithaca.
Hanks, C. S., Oneonta.
Heiss, H. V., Lestershire.
Hill, Wm. L., Owego.
Howe, Fred B., Ithaca.
Howe, J. B., Ithaca.
Ingalls, C. E., Cortland.
Ingalls, L. S., Cortland.
Ivory, James T., Chenango st., Binghamton.
Jenks, F. M., Ithaca.
Johnson, R. A., Bainbridge.
Kelly, J. D., Kilmer Building, Binghamton.
LeSuer, W. J., Oneonta.
Mayor, Wm. E., Owego.
McCall, F. W., Centenary st., Binghamton.
Miller, H. J., New Berlin.
Mitchell, H. B., Elmira.
Moore, H. A., Elmira.
Needham, A. V., Oneida.
Nelson, E., Waverly.
Noble, L. E., Endicott.
Ogden, J. D., Kilmer Building, Binghamton.
Ogden, Wm. A., Security Mutual Building, Binghamton.
Payne, D. B., Sherburne.
Peters, A. S., Worcester.
Peterson, H. A., Elmira.
Pitcher, E. L., Cooperstown.
Pritchard, E. J., Hancock.
Pritchard, W. H., Newark Valley.
Pulver, Geo. W., Ackerman Building, Binghamton.
Roe, M. N., Owego.
Root, R. T., Main st., Binghamton.
Sears, S. C., Trumansburg.
Sharp, W. N., Binghamton.
Smith, F. W., Elmira.
Smith, Herman, Trumansburg.
Smith, Julian, Union.
Soden, F. B., Norwich.
Sturdevant, T. B., Elmira.
Stuart, T. R., Ithaca.
Suter, R. B., Elmira.
Tatlock, F. H., Oneonta.
Thompson, C. E., Oxford.
Turner, A. D., Binghamton.
Turner, H. H., Marathon.
Wells, H. P., Hamilton.
West, J. B., Elmira.
Whitmarsh, H. D., 122 Oak st., Binghamton.
Wilbur, R. A., Elmira.
Willis, F. M., Ithaca.

HONORARY MEMBERS.

Burchill, J. E., Cortland.
Butler, A. S., Pasadena, Cal.
Flaherty, I. V., Chittenango.
Hall, Wm. H., Binghamton.
Hoysradt, B. W., Ithaca.
Harris, E. W., Pomona, Cal.
Kelly, W. B., Towanda, Pa.
King, H. B., Roxbury.
McCall, John Oppie, Buffalo.
Melotte, G. W., Ithaca.
Newell, J. K., Towanda, Pa.
Quintero, J. M., Lyons, France.
Rischell, E. S., Athens, Pa.
Smith, W. W., Montrose, Pa.
Spencer, C. W., Sidney.
Thompson, F. R., Homer.
Watts, Willis E., Lyons, France.

LIFE MEMBER.

Downs, E. D., Owego.

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Seventh District.

THE annual meeting of the Seventh District Dental Society of the State of New York was held April 10, 1915, and the following persons were elected officers for the ensuing year:

President—A. P. Burkhart, Auburn.
Vice-president—John J. Scott, Rochester.
Recording Secretary—J. L. Weller, Jr., Rochester.
Corresponding Secretary—C. G. Morsheimer, Rochester.
Treasurer—E. L. Schlottman, Rochester.
State Dental Examiners—W. A. White, Phelps, and J. Ed. Line, Rochester.
Members of Executive Council—B. S. Hert (regular), and C. L. Brininstool (alternate).

The following were elected to serve on State Society Committees: B. W. Palmer, Rochester (Law); E. G. Link, Rochester (Legislative); A. W. Smith, Rochester, and W. W. Belcher, Rochester (Oral Hygiene).

Respectfully submitted,

C. A. HOWLAND, *Sec'y.*

ACTIVE MEMBERS.

Agnew, F. L., 63 Monroe ave., Rochester.
Allen, D. H., Honeoye Falls.
Avery, R. B., Auburn.
Bachman, C. C., Waterloo.
Banks, J. L. E., 107 Dake Building, Rochester.
Barr, W. H., 800 Main st. W., Rochester.
Barrett, W. R., Spencerport.
Becker, A. D., Palmyra.
Beebee, J. H., 913 C. of C. Building, Rochester.
Belcher, H. L., Seneca Falls.
Belcher, W. W., 186 Alexander st., Rochester.
Bennett, C. A., 317 Powers Building, Rochester.
Bliss, T. C., Hornell.
Bostwick, W. A., 133 Clinton ave. S., Rochester.
Bradley, M. C., Avon.
Brininstool, C. L., 1103 Granite Building, Rochester.
Brown, H. O., Waterloo.
Bryant, F. E., 308 Jefferson ave., Rochester.
Bryant, S. R., 308 Jefferson ave., Rochester.
Buckland, P. F., Corning.
Burns, G. G., 47 Elwood Building, Rochester.
Burkhart, A. P., 52 Genesee st., Auburn.
Burkhart, G. A. P., 121 Genesee st., Auburn.
Cameron, J. H., Caledonia.
Carey, J. H., 115 N. Union st., Rochester.
Charles, O. R., Naples.
Chase, C. D., 174 Carson ave., Rochester.
Clapp, E. A., Livonia.
Clark, B. F., 133 Clinton ave. S., Rochester.
Conklin, W. H., 522 Mercantile Building, Rochester.
Conyne, Geo., Canandaigua.
Conyne, R. J., 1064 Main st. E., Rochester.
Cowan, J. W., Geneseo.
Crump, I. J., 20 Triangle Building, Rochester.
Demerath, C. F., 511 E. & B. Building, Rochester.
Dengler, F. J., 214 Wilder st., Rochester.
Dunn, J. E., 334 Main st. W., Rochester.
Durrant, J. B., Honeoye Falls.
Eckler, H. F., Gregory st. and South ave., Rochester.
Fairfield, H. C., Geneva.
Foley, J. M., Plymouth ave. and Clarissa st., Rochester.
Fraley, C. J., Geneseo.
Frank, H. L., East Rochester.
Frantz, F. J., Hornell.
Furner, J. S., Lima.
Gamble, W. D., Wayland.
Gilbert, L. H., 703 E. & B. Building, Rochester.
Goble, L. S., 40 Triangle Building, Rochester.
Graves, J. W., 32 Triangle Building, Rochester.
Greene, F. A., Geneva.
Griswold, E. R., Dansville.
Griswold, V. H., 102 Weld st., Rochester.
Hall, A., 43 Main st., Hornell.
Hammond, H. E. J., 14 William st., Auburn.
Hanna, J. N., 575 Main st. W., Rochester.
Hert, B. S., 713 C. of C. Building, Rochester.
Hettig, A. F., 227 Cutler Building, Rochester.
Hicks, B. G., Canandaigua.
Hofheinz, R. H., 818 C. of C. Building, Rochester.
Holcombe, R. J., 422 Mercantile Building, Rochester.
Holmes, H. N., Canandaigua.
Horton, F. C., Clyde.

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Horton, G. L., 12 William st., Auburn.
Horton, H. S., Avoca.
Howland, C. A., 901 C. of C. Bldg., Rochester.
Hughes, Wm., 139 Genesee st., Auburn.
Hulme, M. L., 75 S. Fitzhugh st., Rochester.
Ivory, F. M., 57 Triangle Building, Rochester.
Kohler, M. W., Fairport.
Kühn, F. W., Dansville.
Lascell, E. R., Charlotte.
Lewis, E. F., 508 E. & B. Building, Rochester.
Link, E. G., 226 Cutler Building, Rochester.
Locke, G. E., Brockport.
Lowe, G. C., 813 C. of C. Building, Rochester.
Lynch, C. G., 164 Park ave., Rochester.
Marshall, Howard E., Lyons.
Marvin, G. P., 211 Cutler Building, Rochester.
Mattison, J. J., Canandaigua.
McIntee, J. T., 248 Cutler Building, Rochester.
McMullen, M. F., 383 Main st. E., Rochester.
McPherson, P., Caledonia.
Meaker, S. R., Auburn.
Messerschmitt, F., 1023 Granite Building, Rochester.
Meyers, W. A., 124 Genesee st., Auburn.
Middaugh, J. E., Phelps.
Milne, C. C., 3 Lyell ave., Rochester.
Moll, C. F., 1 East ave., Rochester.
Morsheimer, C. G., 133 Clinton ave. S., Rochester.
O'Neill, W. B., 747 Main st. W., Rochester.
Palmer, B. W., 232 University ave., Rochester.
Parmelee, J. H., 418 Mercantile Building, Rochester.
Parrish, W. A., Avon.
Povall, W. H., Mt. Morris.
Priest, P. F., Canisteo.
Proseus, F. W., 270 Monroe ave., Rochester.
Pulver, P. C., 525 Mercantile Building, Rochester.
Reeves, H. C., Fairport.
Requa, L., 324 Cutler Building, Rochester.
Rood, F. M., 700 E. & B. Building, Rochester.
Sager, A. E., 624 Mercantile Building, Rochester.
Sanford, 35 Elwood Building, Rochester.
Saunders, B. G., 83 East ave., Rochester.
Schake, Sarah M., 711 C. of C. Building, Rochester.
Schlottman, E. L., 809 C. of C. Building, Rochester.
Scott, J. J., 901 C. of C. Building, Rochester.
Sebold, F. C., Auburn.
Shaddock, F. J., 819 C. of C. Building, Rochester.
Sharp, E. T., Victor.
Showers, C. F., Corning.
Slorah, G. W., 157 Clinton ave. N., Rochester.
Smith, A. W., 33 Chestnut st., Rochester.
Smith, P. W., 919 C. of C. Building, Rochester.
Smith, W. W., 83 East ave., Rochester.
Stott, H. B., 433 Mercantile Building, Rochester.
Sutherland, L. D., Canandaigua.
Sweet, E. J., 44 Main st., Hornell.
Tarrant, F. J., 637 Main st. W., Rochester.
Thorn, C. A., 702 Clinton ave. N., Rochester.
Tillotson, R. R., Lyons.
Vanderbelt, C. R., 412 Beckley Building, Rochester.
Waldron, C. R., 1129 Granite Building, Rochester.
Wallace, W. R. J., Canandaigua.
Welch, J. W., Fairport.
Weller, J. L., Jr., 424 Mercantile Building, Rochester.
White, W. A., Phelps.
Windell, W. A., 720 E. & B. Building, Rochester.

HONORARY MEMBERS.

Adams, D. F., Minnesota.
Goode, G., New York.
Howard, C. T., Rochester.
Jenkins, N. S., Paris.
Miller, H. S., Rochester.
Nicholson, C. H., Ontario.
Smith, M. H., Colorado Springs.
Walters, J. S., Eugene, Ore.
Ward, C. H., Rochester.
Watson, G. H., Berlin.

LIFE MEMBERS.

Elmendorf, C., Penn Yan.
Line, J. Ed., Rochester.
La Salle, B. F., Rochester.
Miller, H. S., Rochester.
Osgood, A., Bath.
Smith, P. H., Rochester.

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Eighth District.

THE annual meeting of the Eighth District Dental Society of the State of New York was held on April 13, 1915, and the following persons were elected officers for the ensuing year:

President—Harry F. Tanner, Medina.

Vice-president—M. Burton Eshleman, Buffalo.

Recording Secretary—J. A. Sherwood, Buffalo.

Corresponding Secretary—B. W. Whipple, Olean.

Treasurer—Fred. A. Ballachey, Buffalo.

Librarian—Arthur F. Isham, Buffalo.

Assistant Librarian—Frank W. Low, Buffalo.

Editor—J. Wright Beach, Buffalo.

Board of Censors—A. E. Mimmack, W. B. Dickson, H. A. Pullen, H. J. Burkhart, and A. E. Preston.

State Dental Examiners—H. J. Burkhart and J. A. Sherwood.

Members of Executive Council—Robert Murray (regular), and A. Hoffman (alternate).

The following were appointed to serve on State Society committees: A. E. Mimmack (Law); H. J. Burkhart (Legislative); J. Wright Beach and D. H. Young (Oral Hygiene).

During the season the regularly scheduled meetings were held and in addition a union meeting of three days in November, in which the Fifth, Sixth, and Seventh District Societies joined, and which through the efforts of our energetic chairman, J. Porter Mallory, and his co-workers on the business committee, A. F. Isham and J. A. Sherwood, proved the most successful dental meeting ever held in this district.

Our city's free dispensaries are proving a boon to our worthy poor children, and the Buffalo Orphanage, which this society has taken under its protecting wing, has under the system inaugurated by Chairman A. Hoffman become the special charge of each member, every Wednesday afternoon for a whole year in advance being already taken, and marked off on some appointment book for this worthy charity.

We have during the past year lost some members through suspension for non-payment of dues; three have died, viz, Drs. F. P. Leigh, Attica, G. W. Pringle, Niagara Falls, and R. E. Luther, Batavia—of whom more in the report of the Necrology Committee; and there have been several resignations. We have, however, added thirty-four new members, and our roll now numbers over two hundred for the first time in our history, and if the campaign begun by our retiring president, J. G. Roberts, is continued, we hope soon to double our membership.

Respectfully submitted,

M. BURTON ESHLEMAN, *Sec'y.*

ACTIVE MEMBERS.

Agnew, Thos. H., Medina.
Allen, Chas. E., Brocton.
Backus, Herman W., 99 Elmwood ave., Buffalo.
Backus, W. M., 475 Grant st., Buffalo.
Baitz, Arthur G., 78 W. Oakwood Place, Buffalo.
Ballachey, F. A., 450 Elmwood ave., Buffalo.
Barclay, H. L., 112 Purdy st., Buffalo.
Barrows, D. E., Olean.
Bartlett, W. B., Castile.
Bates, O. W., 186 Seneca st., Buffalo.
Beach, J. W., 131 Allen st., Buffalo.
Benson, Stephen S., Belfast.
Beyer, F. A., 559 Main st., Buffalo.
Boughton, W. E., Batavia.
Brown, Robt., 1865 Niagara st., Buffalo.
Brumberg, Louis, 373 Clinton st., Buffalo.
Buell, C. K., 131 Allen st., Buffalo.
Burkhart, H. J., Batavia.
Burley W. J., Gowanda.
Burns, E. F., 1375 Main st., Buffalo.
Bush, Wm. W., Rushford.
Butler, C. S., 267 Elmwood ave., Buffalo.
Carmichael, D. D., LeRoy.
Caulkins, C. R., Perry.
Caulkins, R. W., Perry.
Cavers, W. W., 722 Main st., Buffalo.
Chester, H. M., 51 Park st., Buffalo.
Childs, Lowell L., Springville.

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Christenson, J. C., 106 Falls st., Niagara Falls.
Clements, J. L., 530 W. Utica st., Buffalo.
Clifford, J. F., 62 Main st., Lockport.
Cogan, Maurice J., 359 Connecticut st., Buffalo.
Collins, J. P., 504 Brisbane Building, Buffalo.
Collins, John F., 580 Elmwood ave., Buffalo.
Common, John, Andover.
Consul, Arthur H., 404 E. Genesee st., Buffalo.
Coon, W. W., Alfred.
Cramer, J. W., Albion.
Crocker, F. M., Perry.
Cursons, Leon V., 331½ Franklin st., Buffalo.
Dayment, F. L., 450 Elmwood ave., Buffalo.
Dewey, C. E., Batavia.
Dickson, W. B., 446 Genesee st., Buffalo.
Diltz, David A., Warsaw.
Dixon, J. A., 917 Jefferson st., Buffalo.
Doolittle, G. P., Albion.
Downes, C. R., 100 Main st., Lockport.
Dudley, J. R., Olean.
Duncan, J. C., 6 West ave., Lockport.
Earley, S. J., Olean.
Edgerly, S. C., 743 Fillmore ave., Buffalo.
Ellis, W. H., 397 Delaware ave., Buffalo.
Ellwood, G. T., 55 Parker ave., Buffalo.
Ernsmere, J. B., 308 W. Ferry st., Buffalo.
Eschelman, S., 421 Franklin st., Buffalo.
Eshleman, M. Burton, 170 Hodge ave., Buffalo.
Farmer, E. J., 265 W. Ferry st., Buffalo.
Fay, M. L., 379 Hudson st., Buffalo.
Fenton, W. C., Attica.
Fiero, Guy M., 1370 Main st., Buffalo.
Fish, J. B., 759 Tonawanda st., Buffalo.
Flagg, C. E., 158 Anderson Place, Buffalo.
Frank, F. L., 718 Elmwood ave., Buffalo.
Frey, George J., 209 D. S. Morgan Building, Buffalo.
Froeber, Edward George, 462 E. Genesee st., Buffalo.
Garretson, J. L., 481 Elmwood ave., Buffalo.
Garrett, F. S., 527 Main st., Buffalo.
Geenen, G. J., 221 Hampshire st., Buffalo.
Gemmill, R. A., Lockport.
Glazier, L. F., Springville.
Graf, E. G., 706 Michigan ave., Buffalo.
Graf, Katharine M., 252 Broadway, Buffalo.
Gregg, M. A., 103 Genesee st., Buffalo.
Greenfield, W. C., 169 Northland ave., Buffalo.
Hall, Fred J., 43 W. Tupper st., Buffalo.
Hammersmith, P. C., 25 Indian Church Road, Buffalo.
Harper, F. E., Angola.
Hartman, J. A., 816 15th st., Washington, D. C.
Havens, F. C., Niagara Falls.
Heinrich, Albert, 541 Walden ave., Buffalo.
Hicks, J. R., 55 Allen st., Buffalo.
Hicks, T. A., 55 Allen st., Buffalo.
Hill, Frank P., 731 Prospect ave., Buffalo.
Hoffman A., 529 Franklin st., Buffalo.
Hollister, A. H., 13 E. Main st., Fredonia.
House, C. W., Holland.
Hughey, G. M., 1355 Main st., Buffalo.
Huver, H. B., 100 D. S. Morgan Building, Buffalo.
Isham, A. F., 85 N. Pearl st., Buffalo.
Jackson, Graham E., The Wellesley, Buffalo.
Jackson, L. E., Franklinville.
Jones, O. E., Wellsville.
Jung, A. H., 64 Goodell st., Buffalo.
Jung, E. P., 582 Genesee st., Buffalo.
Kehr, G. B., 242 Forest ave., Buffalo.
Kendall, C. A., 316 Pearl st., Buffalo.
Kitching, H. W., Hamburg.
Knocke, Elmer J., 902 General Elec. Building, Buffalo.
Lahey, Arthur R., 2001 Main st., Niagara Falls.
Landell, C. A., 605 E. Genesee st., Buffalo.
Leake, W. J., Lockport.
Lee, Francis J. M., 1298 Jefferson st., Buffalo.
Leitze, G. L., 1137 E. Genesee st., Buffalo.
Leland, Lloyd E., 1872 Niagara st., Buffalo.
Lindgren, Lennart J., 980 Elmwood ave., Buffalo.
Lorenz, Geo. W., 66 Goodell st., Buffalo.
Low, F. W., 52 N. Pearl st., Buffalo.
Lugsdin, F. G., 131 Allen st., Buffalo.
MacDougall, S. E., 530 Brisbane Building, Buffalo.
Madden, J. J., 49 Niagara st., Buffalo.
Main, D. T., 337 Niagara st., Buffalo.
Mair, C. R., 1157 Michigan st., Buffalo.
Mallory, J. P., 463 W. Ferry st., Buffalo.
Marshall, W. E., Box 27, Eden.
Maul, Irving E., 519 Main st. E., Batavia.
McCall, J. O., 131 Allen st., Buffalo.
McCarthy, A. J., 131 Allen st., Buffalo.
McCarthy, James J., Olean.
McCoy, D. H., 899 Main st., Buffalo.
McMichael, H. R., 15 Oxford ave., Buffalo.
Meisburger, L., 85 N. Pearl st., Buffalo.
Mimmack, A. E., 795 Elmwood ave., Buffalo.
Middleton, C. O., 36 Young st., Tonawanda.
Montgomery, W. R., 505 Franklin st., Buffalo.

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Morgan, G. H., 2 N. Pearl st., Buffalo.
Mouthrop, G. F., 273 W. Ferry st., Buffalo.
Muir, Robert, 21 Main st., Gowanda.
Mulcahy, L. L., Batavia.
Muntz, E., 867 Washington st., Buffalo.
Murray, Robert, 761 Elmwood ave., Buffalo.
Newman, T. E., 546 Tonawanda st., Buffalo.
Noyes, W. P., Olean.
O'Shea, Thos. F., LeRoy.
Otis, N. L., East Aurora.
Packwood, E. S., 1370 Main st., Buffalo.
Pankow, C. A., 327 William st., Buffalo.
Parker, R. C., Sycamore and Fillmore aves., Buffalo.
Paxson, G. A., Hamburg.
Prefert, Albert, 778 Genesee st., Buffalo.
Prentice, W. H., Warsaw.
Preston, A. E., Delevan.
Pullen, H. A., 131 Allen st., Buffalo.
Raub, Herbert D., Olean.
Read, E. M., Perry.
Read, Harry S., Medina.
Reynolds, H. E., 577 Broadway, Buffalo.
Roberts, J. G., 174 E. Ferry st., Buffalo.
Robinson, L. W., 129 Elmwood ave., Buffalo.
Ruszaj, S. E., 1012 Broadway, Buffalo.
Ryerse, O. G., 727 Seneca st., Buffalo.
Schnitzspahn, E. E., 18 St. Johns Place, Buffalo.
Sharp, C. H., 73 Main st., Lockport.
Sherlock, C. E., Lockport.
Sherwood, J. A., 283 Bryant st., Buffalo.
Simonds, G. H., 106 Pearl st., Medina.
Skinner, G. W., 70 W. Chippewa st., Buffalo.
Skinner, O. M., 968 Ridge Road, Lackawanna.
Sortore, J. F., Belmont.
Spillman, Josephine H., 64 Webster st., N. Tonawanda.
Squire, D. H., 488 Franklin st., Buffalo.
Squires, L. A., 2337 Main st., Buffalo.
Stackhouse, J. A., 186 Allen st., Buffalo.
Stanton, E. P., 361 Porter ave., Buffalo.
Steigerwald, C. C., 564 William st., Buffalo.
Stiker, A. G., Addison.
Storms, C. L., 153 E. Utica st., Buffalo.
Sugnet, Edward L., 537 William st., Buffalo.
Sweeney, John, Olean.
Tanner, H. F., Medina.
Tench, J. M., 1353 Jefferson st., Buffalo.
Tench, R. W., 220 42d st. W., New York City.
Terry, I. L., 737 Seneca st., Buffalo.
Tesch, Frederick C., Niagara Falls.
Thompson, D. M., Niagara Falls.
Tillotson, C. R., 308 W. Ferry st., Buffalo.
Todd, E. L., Dunkirk.
Underwood, F. H., 1063 Ellicott st., Buffalo.
Wagner, W. J. A., Sherman.
Wardner, J. F., Lackawanna.
Warner, C. A., 39 S. Niagara st., Tonawanda.
Washburn, F. M., Perry.
Weaver, F. C., 6 West ave., Lockport.
Whipple, B. W., 301 Union st., Olean.
Whipple, E. O., 301 Union st., Olean.
Whipple, H. L., Cuba, N. Y.
Wiles, L. E., Fillmore.
Wilmot, Max D., 488 Franklin st., Buffalo.
Wolfsohn, Myron D., 165 William st., Buffalo.
Woodley, F. E., 123 Falls st., Niagara Falls.
Young, D. H., Attica.

LIFE MEMBERS.

Lewis, Theo. G., Buffalo.
Snow, George B., Long Beach, California.

Ninth District.

THE annual meeting of the Ninth District Dental Society of the State of New York was held at Newburgh, April 9, 1915, and the following persons were elected officers for the ensuing year:

President—Robt. Morrow, Nyack.
Vice-president—A. W. Twiggar, Ossining.
Recording Secretary—W. M. Stanbrough, Newburgh.
Corresponding Secretary—D. W. McLean, Mt. Vernon.
Treasurer—L. W. Helm, Peekskill.
Librarian—H. L. Barnum, Newburgh.
Members of Executive Council—W. V. Randall (regular—unexpired term) and A. W. Twiggar (alternate).

The following were appointed to serve on State Society Committees: D. W. McLean (Law); H. C. McBrair (Legislative); W. V. Randall and Bertram Ball (Oral Hygiene).

Respectfully submitted,

L. W. HELMS, *Treasurer*.

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ACTIVE MEMBERS.

Allen, E. G., Port Chester.
Anderson, A. E., Peekskill.
Ashplant, P. R., Newburgh.
Ball, Bertram, Yonkers.
Bander, P., Newburgh.
Bannan, P. C., Newburgh.
Barnum, H. L., Newburgh.
Bedell, A. P., Mt. Vernon.
Bedell, W. H., Poughkeepsie.
Bennett, H. C., Newburgh.
Carr, S. C., Newburgh.
Chatterton, J. W., Poughkeepsie.
Clark, R. L., Mt. Vernon.
Cole, J. R., Dobbs Ferry.
Conover, C. A., Newburgh.
Cowles, E., Beacon.
Darrow, H. N., Mt. Vernon.
DeWitt, H. S., Middletown.
Downing, V. F., Poughkeepsie.
Dunning, W. O., Middletown.
Duryea, E. C., Peekskill.
Ehleider, T. J., Poughkeepsie.
Ermann, F. P., Warwick.
Fancher, W. E., Yonkers.
Fancher, W. M., Ossining.
Fisher, W. C., Bronxville.
Foote, P. L., Poughkeepsie.
Frachtman, Philip, Suffern.
Franzius, G. H., Bronxville.
Granger, A. L., Mt. Vernon.
Green, H. B., Tarrytown.
Gurnee, C. D., Beacon.
Hammond, G. A., Port Jervis.
Helms, L. W., Peekskill.
Hepworth, J. T., Wappingers Falls.
Johnson, J. H., Port Jervis.
Kidel, W., Newburgh.
Knapp, W. A., Millerton.
Lansing, C. T., Yonkers.
MacElroy, Marie, Mt. Vernon.
Massoth, H. P., New Rochelle.
McBrair, H. C., Middletown.
McLean, D. W., Mt. Vernon.
Mills, J. J., Port Jervis.
Morris, G. W., Central Valley.
Morrow, Robt., Nyack.
Northrup, G. A., Poughkeepsie.
Palmer, Stephen, Poughkeepsie.
Parker, E. G., Goshen.
Patterson, J. E., Poughkeepsie.
Phin, A. E., Peekskill.
Randell, W. V., Newburgh.
Ryder, H. L. B., Poughkeepsie.
Smith, Fred., Newburgh.
Stanbrough, W. M., Newburgh.
Suffern, E. R., Suffern.
Sutherland, J. R., Monroe.
Sweezy, F. W., Port Jervis.
Swift, T. C., Mt. Vernon.
Thompson, C. H., Goshen.
Tice, C. H., Middletown.
Traver, W. E., Red Hook.
Turner, C. G., Poughkeepsie.
Twiggar, A. W., Ossining.
Ulsaver, E. S., New Rochelle
Vail, C. T., Yonkers.
Varcoe, E. R., Goshen.
Vernon, G. H., Middletown.
Writer, G. S., Nyack.
Wygant, G. P., Peekskill.

HONORARY MEMBER.

Hutchinson, R. G., New York City.

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President's Address.

By Dr. ALBERT M. WRIGHT, Troy.

IN the exercise of your rights of self-government, one year ago you committed to my care the honor of being your presiding officer for the ensuing year. In the discharge of my duties I have used all caution not to strain the constitution or by-laws to a breaking-point.

My duties have been many, but I have found in them great pleasure, the greatest of which has been the meeting of so many big-hearted, clear-headed, broad-minded men from all parts of the state, and all of them dentists—dentists whose greatest aim in life is the greatest good to the greatest number of their fellow men.

DUTIES OF THE PRESIDENT, AND THEIR DISCHARGE.

Section 8 of our by-laws provides that the president shall "render a concise statement of the condition of the district and state societies at our annual meeting," and in order to do so I have tried to place myself in close touch with every district society within the state, as well as the Jefferson County Dental Society.

On November 19th, 20th, and 21st I visited the union meeting of the Fifth, Sixth, Seventh, and Eighth districts convened at Buffalo. It was a largely attended meeting, with a membership of 453 in the four districts. There were registered on the second day over three hundred members. Dr. Roberts, president of the Eighth district, told me that in his district alone there would be an addition of nearly fifty to the membership by May 1st.

On December 11th I visited the baby of our family—the Ninth district—and I assure you the baby has outgrown its swaddling-clothes. It is one of the most wideawake district societies in the state, and developing very fast. The attendance was good, comprising forty-two out of a membership of fifty-five. The enthusiasm displayed more than made up for the small membership. The program was good, the essays above the average.

On December 12th, following a night's ride on the train from the Ninth district at Yonkers, I visited the Jefferson County Dental Society at Watertown. This society is within the jurisdiction of the Fifth district, and I believe all are members of that society. Greatly to my surprise, I found a large, flourishing

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society, with an attendance much larger than many of our district societies, and all seemed intensely interested in their work. The speaker of the day is well known to you all, Dr. Weston A. Price of Cleveland.

On January 19th I visited the Fourth district and had the pleasure of hearing the secretary read the names of twenty applicants for membership. The Fourth District Society always furnishes a fine program, and is well noted throughout the state as having the finest lot of men found in any district. Expense in having a first-class meeting is never taken into consideration, as the "boys" in that district are all rich—or at least rich in hospitality. Of a membership of seventy-one, fifty were in attendance.

On January 23d I had the pleasure of being a guest at a banquet given by the Buffalo Dental Association. This is one of the oldest dental associations in the state, being much older than the district or state societies. As a matter of fact in 1867 this society appointed Drs. Whitney, Snow, and Southwick a committee to confer with the dentists throughout the state, with a view of introducing into the legislature a measure to legalize the practice of dentistry, and obtain a charter for the district and state societies.

On January 30th I met with the Executive Council and Special Law Committee, at Syracuse.

On February 11th I had the pleasure of visiting the Second district in Brooklyn, accompanied by about fifteen members of the Third and Fourth districts. This was, in fact, a return call, the Third and Fourth having had the pleasure of receiving a large delegation from the Second a short time previously at Troy. I assure you, this visit was a red-letter night for all who made the trip. Of a membership of 225, about 180 were in attendance.

On March 1st I attended a meeting of the First District Society at the Academy of Medicine. Of a membership of about 400, nearly 250 were present. There is little need for my saying anything of the First or Second District Dental Societies. We all know that from those two societies emanates the best, the brightest, and the cleanest and most up-to-date thought that is given to the dental world. From here the most modernized methods of any specialized line of dental practice are spread broadcast. The only criticism I would offer is that the membership of both societies should be doubled each year for some time to come. You have the material, the timber, for the largest and best dental societies in the world. All that is needed is a little concerted action by the older members, a little give-and-take by all, and a little more "wearing of the harness" by the young men.

On March 26th I visited the Sixth District Society at Binghamton. Although I had visited the Sixth in conjunction with the Fifth, Seventh, and Eighth at Buffalo, I thought it advisable to do so again. The Sixth District Society has a membership of about eighty, forty-six of whom were in attendance. Five new names were presented for membership. Although the attendance was but a little over one-half of the membership, the proceedings were of great interest, and a majority of those present took part in the discussion of the papers read.

On April 17th I attended the Third district, making good my forty-fifth consecutive annual meeting—a lifetime without a miss of annual or semi-annual

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gatherings. I listened with great pleasure to the reading of twenty-five applications for membership, the greatest number ever known at any one meeting in the Third district. While our membership was sixty-two one year ago, we now have eighty-seven. Sixty-five members were in attendance. It is best that I say nothing more of the Third district, because you might accuse me of being prejudiced in its favor. Suffice to say, it is my first love.

The Seventh district invited me to attend their meeting on April 9th and 10th, but I was obliged to decline. I am thoroughly convinced after visiting the various districts that most of us are depending too much upon outside talent for essays, to the detriment of home talent, which is allowed to lie dormant year after year.

It is certainly up to every district to strengthen and build up the efficiency of its individual members to take their proper station in their own district work, as well as in the State and National societies. All essays that I heard from home talent were well-written and would reflect credit upon the home district if read before any dental society.

CONDITIONS REVIEWED.

I feel assured that the component parts of our State Society were never supported more loyally, and were never more prosperous and harmonious than at present. Much greater efforts are being made in the country districts for an increase in membership than in the large cities. We must ever bear in mind that "As the twig is bent, the tree is inclined," and do all in our power to induce the young man to join his district society and get into the working harness. Last year the First district reported 427 active members; at present they have 432, a gain of five. We must not forget that some were dropped for non-payment of dues—so five does not represent the total of new members.

The Second district reports thirty-two new members during the year; the Third district twenty-four; the Fourth district twenty; the Fifth a loss of four; the Sixth district a gain of eight; the Seventh district fourteen new men; the Eighth thirty-four new members, and the Ninth district thirteen new men—our total gain will be about one hundred and fifty.

Last year there were registered at our May meeting 373, or 276 members and 97 visitors. Divided among the districts, there were present, from the First, a little over one-eighth of their membership, or 51; from the Second, a little over one-ninth, or 26; from the Third, about three-fifths, or 39; from the Fourth, a little over two-thirds, or 52; from the Fifth, a little less than one-third, or 29; from the Sixth, a little less than one-seventh, or 11; from the Seventh, a little less than one-eighth, or 15; from the Eighth, a little less than one-ninth, or 18; from the Ninth, a little over one-third, or 35.

Of the 97 visitors, 48 were from this state: From the First district, 11; from the Second, 2; from the Third, 9; from the Fourth, 14; from the Fifth, 7; from the Sixth, 1; from the Seventh, 2; from the Eighth, 0; from the Ninth, 3.

OUR STATE SOCIETY.

I have been expecting a good healthy increase in attendance this year. We have a membership at present of about fourteen hundred, and certainly it is not too much to expect fifty per cent., or

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seven hundred, present, all knowing that we meet but once a year. It would almost seem, at times, that we have members who spend the entire year trying to devise some honest means of proving an alibi for staying away from our sessions. If they were more conversant with the big Book, they might try the old excuse for not doing their duty, "I had to go bury my father."

Our state contains over five thousand registered dentists, and we should have at the very least three thousand members in good standing. This can be easily accomplished within one year by the concerted action of our individual members.

ESSAYS.

At this meeting you cannot afford to miss any part of any paper. The writers are among the most prominent in their special fields. The speakers who have promised to open the discussions are the best we have in this state, and their subjects are well in hand.

SCIENTIFIC RESEARCH WORK.

I expect every member to be present at the presentation of the report of the Scientific Research Committee by Drs. Dunning and Gies. Each year the report is getting closer into our working life, our pleasures and trials.

You cannot afford to miss any reports, because you know it is customary for this society to bury all its essays and reports until all semblance of freshness is removed, or perhaps it is for the purpose of giving any new theories a chance to explode before they are put into print.

CLINICS.

Our clinics, which will be held on Friday morning from 9.30 to 12.30, are in the hands of Dr. Warrington G. Lewis, as chairman, assisted by one good man from each district. When Dr. Lewis puts his hands to the plow, he never looks backward, and this fact insures his best work and a good clinic.

GOLDEN ANNIVERSARY.

As our State Society was organized on the first Tuesday in June 1868, our fiftieth anniversary—our golden jubilee—will occur in the spring of 1918, three years from now. We have no time to waste if we wish to celebrate that event in a suitable manner for the Empire State. And if we do celebrate at all, it must be in royal form. First, we must raise a goodly sum of money, because the expenses will be heavy. We ought to have at least four thousand dollars to spend, and we have only the three years to raise it in. Just think what this celebration would stand for!—the golden anniversary of the society which has given more to the dental world than all other societies combined. We must be prepared to entertain many celebrated men from abroad as well as from distant parts of our own country.

We must be prepared to devote nearly a week to this celebration. There is one unpleasant feature: Albany cannot furnish accommodations for those who would attend. It must occur in some city where space and hotel accommodations are unlimited. And one important feature of the celebration is, we must have occupying the presidential chair in 1918 a big man, a brainy man, a broad man—one who is a leader among men. We have just such men in our society, and one should be elected vice-president in 1916, one year from now, in order to be in line in 1917. My great object in bringing this before you is that we have

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no time to lose if we celebrate in style suitable to the reputation of this society throughout the world.

To bring this subject into some form for consideration, I would recommend that a committee of three be appointed to confer with the Executive Council as to the advisability of such a celebration, and if thought advisable, to devise some method for raising the required funds, a report from said committee to be made some time during one of our sessions on Friday.

PRINTING PROCEEDINGS.

I wish to call your attention to a subject of vital importance to our society, the publication of our proceedings. We are in the unfortunate position of having no journal of our own, or one in which we have the slightest financial interest. All proceedings are placed in the hands of a journal published outside of this state, and the proceedings are published whenever there is room, and we receive the full report eleven months after the meeting.

Think for one moment of a scientist laboring over one line of thought for months or years in investigations, and gathering data to be presented to the dental world through the Dental Society of the State of New York, where it is read—if the essayist be fortunate—to an audience of two hundred, and then buried. A labor of love extending over years of time buried beyond resurrection, or until the whim of a publishing house blows its trumpet some fine morning, and lo! it goes to print! Every essay and committee report read before this society represents work, and should have an audience of forty thousand dentists within six weeks after reading—but it is buried. Someone working along similar scientific lines takes the result of his research work directly to the publisher, and forty thousand dentists read it, while ours lies buried to be resurrected eleven months later.

We as a society should give the writer who presents a paper or a report before us all honors possible, and that would include giving his work to the world at the earliest possible moment, and in its best possible condition.

I would most earnestly recommend that the Committee on President's Address present this subject to the Executive Council, with an urgent request that they devise some means of having the proceedings of this society published within a reasonable length of time.

HARRISON ANTI-NARCOTIC LAW.

The dental profession is in a very fortunate position under the Harrison Anti-Narcotic Law. I do not object to the license fee of one dollar per year, even if it does cost one dollar and thirty-two cents to collect it. It is the half-dozen other little penny-ante conditions and records to comply with. It would seem a good time for fifty thousand dentists to get in close touch with their representative in the National Government for relief of some nature.

LEGISLATION.

I regret exceedingly that we failed during the past session of the legislature in passing the dental measure proposed by our Special Law Committee, and agreed to fully by the Executive Council.

I am not a politician, nor do I know much of lobby work, but if this society wishes to get any measure through the legislature, we must have a man on the ground who can stick to the bill day

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and night, and who understands all the "tricks of the trade" of putting bills through. This would cost money, but the bill would get to the governor for signature or veto. I am decidedly in favor of, and would so recommend, that in the future, if a bill is introduced into the legislature by this society, as soon as it is printed, a copy be mailed to every member. I feel safe in saying that not two per cent. of our members knew the text of any one of the six dental bills introduced into the last legislature. These bills as printed can be obtained at very small cost and distributed by our secretary. I assure you that the secretary should in some manner earn his large salary! Each member having a copy of the dental measure would be in much better condition to approach his assemblyman in favor of its passage or defeat.

As our present law stands, it seems foolish for our society to expend money in trying to enforce it. New York City is the only place in the state where convictions can at all be assured, and if the offender is convicted the fine is paid—and the culprit moves up-state, where practicing is absolutely safe. I shall make no recommendations on this subject, but simply bring it to your notice as a body. Will it be best for us to increase our indebtedness any more until we have passed and signed a suitable measure, placing the prosecution in the hands of the Attorney-general?

INVESTIGATION OF THE STATE SOCIETY.

A resolution was introduced in the assembly to investigate the New York State Dental Society, which was charged with graft by the introducer of the measure. I immediately wrote Speaker Sweet, saying we would be "de—ee—lighted," and courted the closest investigation of all of our acts—I would order all records of our society placed at their disposal at any time or place, and also stated that all records of the board of examiners during the past twenty years were in the hands of the Regents, and of course at their disposal. In reply, Speaker Sweet wrote, "Nothing doing."

DEMISE OF DR. A. M. HOLMES.

I do not feel that I can close my address without referring to our charter member, Dr. A. M. Holmes, who since our last gathering passed the great divide. His was a life rich beyond comparison with a love of nature; his greatest aim was that all might share his heritage. Sturdy as the oak and rock in every storm of life, he was as tender in love, in sorrow, and in home life as the clinging vine whose tendrils are constantly seeking support and nourishment from a stronger source. As a botanist, his rank was of no mean order, very few knowing all wild flowers as intimately as did Dr. Holmes. During his active life he owned and cared for personally a large greenhouse just to supply flowers to the sick and poor without expense. A beautiful rose was never quite as beautiful to him as when being admired by those whose sickness or age prevented an active life. Dr. Holmes, as the most of you remember, was a quiet, reserved, self-contained man, but at home he was a child with children, and having none himself, his home was a playground for all who cared to come. He entered into their life and sports as few others could; among his happiest hours were those with little children, wandering through the woods and fields gathering wild flowers, and giving them their first lessons in love of nature.

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There is such a thing as living too long; I never realized it until I attended Dr. Holmes' funeral, at Morrisville. All friends of his own age were gone except one man, but his house was filled, and his last resting-place covered with wild flowers gathered by those whom he had taught, as little children, to love everything that was beautiful; gathered by those whose full life will be better, sweeter, and purer for having been led by the hand of Dr. Holmes through the fields of nature.

Dr. Holmes loved all that was beautiful. He was a friend of all in distress. Music and flowers caused his eyes to dim with tears, but those tears did not prevent him seeking with the purest heart and loyal hand those in need of sympathy and love. I would simply bow my head and pay tribute to a man I had learned to honor, respect, and love, from a close association covering twenty years on the Examining Board. Our Committee on Necrology will inform you fully of his active professional, as well as civil life.

DISCUSSIONS OF ESSAYS.

I wish to bring to your attention the fact that in selecting men to open the discussions on the various papers and reports only three have refused, and two of them wrote me that, when the papers were open for general discussion, they would be very glad to participate. In my opinion that is a wonderful record for any society; every man with his shoulder to the wheel ready to push our forty-seventh annual meeting to a success.

In conclusion, I wish to thank Dr. H. J. Burkhart for invaluable advice which he has so freely given. I fully appreciate his ever kind and courteous replies to my many demands on his time.

To all committees, elective or appointive, I would give credit for the greater share of any success achieved during my administration.

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Report of the Correspondent.

By L. M. WAUGH, D.D.S., New York.

Normal Occlusion the Basis of the Practice of Dentistry.

YOUR Correspondent assumed the duties of his office with the understanding that it is his privilege to make selection of a topic the consideration of which shall be of general interest to the members of the society and to the profession. In deciding upon the subject for this report, it was with the conviction that the title chosen conveys an essential fundamental fact as old as modern dentistry, and yet but little appreciated and employed by practitioners in general. Certain leaders, however, have recognized its value, and have used it in varying degree as the basis for their daily practice. With the hope of urging its importance upon the members and the profession as a whole, it was decided to obtain the opinions of dentists in widely separated sections. To this end a list was compiled consisting of names of members of the profession who had shown interest in advanced methods of practice, together with instructors in the colleges constituting the membership of the American Institute of Dental Teachers in the departments of operative dentistry, prosthetic dentistry, crown and bridge work, oral and special pathology, and orthodontia, and the following letter and list of questions was sent to 260 practitioners:

My dear Doctor,—You have been selected by the Correspondent of the Dental Society of the State of New York as one of the leading minds from whom it is desirable to obtain an expression of opinion on certain questions of an eminently practical nature. It is not the aim, at this time, to solve intricate problems, but simply to impress upon dental practitioners the fact that "Normal occlusion is the basis of the practice of dentistry," and to offer some suggestions that shall serve as a means by which anatomic occlusion may be produced in everyday practice.

The questions may seem very simple, but from dental literature, and especially from opinions expressed in discussion, there is proof that there are still many who have not recognized it as the basis for all dental practice. Therefore your answers, tabulated with those of others, will greatly aid the Correspondent in his humble effort.

Rest assured of the appreciation of the society and the personal gratitude of the Correspondent.

Gratefully yours,
L. M. WAUGH, *Correspondent.*

QUESTIONS.

(1) Do you recognize normal occlusion as the basis of all branches of dental practice?

(2) Do you consider the full complement of natural teeth or their anatomic duplicates as essential to normal occlusion?

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(3) Do you consider the making of "study models" for diagnosis and outlining of treatment as being essential to the most efficient dentistry?

(4) What percentage of so-called pyorrhea do you consider to have had its inception in malocclusion? [This implies also defective approximal contacts.]

(5) Do you recognize a gradual retrogressive change as taking place in the relations of the teeth and arches when in malocclusion?

(6) Do you consider this change to reach the minimum in proportion as the occlusion approaches normal?

(7) Do you believe it best to zealously conserve the third molars that have erupted and taken practically normal positions?

(8) Give briefly your reasons for your answer to No. 7.

(9) In cases where teeth have been extracted and the adjoining teeth have partly closed-in the space, do you consider it best "as a principle" to move the adjoining teeth into their normal positions before placing an artificial substitute?

(10) If not, why?

(11) What means do you employ for producing anatomic occlusion in small areas, as in a single crown and in bridge work?

(12) In making full dentures, do you consider the establishment of the correct position of the models to the point of motion in the articulator as essential to most efficient results?

(13) Do you regard the use of the face-bow or some one of its modifications as essential to this?

(14) Do you consider the reproduction of the marginal, triangular, and oblique ridges, together with well-defined angular grooves and sulci, as an essential factor in restoring efficient occlusion?

(15) Do you consider that in the restoration of lost occlusal areas an accurate anatomic counterpart is necessary to the retention of teeth that have been moved into normal occlusion?

Replies were received from 141 dentists, practicing in twenty-two states and in four provinces of Canada. Answers were sent in by 100 teachers in forty-one of the forty-seven colleges comprising the most recently published membership of the Institute. Therefore the report includes opinions of teachers in all but eight of these dental schools, and in addition that of 41 practitioners who are not associated with dental faculties. It would seem that this should serve as quite a representative expression.

The answers were carefully tabulated and constitute the summary of this report. From this and the goodly number of detailed answers that were given, the list of conclusions was drawn. It has been the constant aim of your Correspondent to base this report wholly upon the opinions expressed in the replies, and while it is obvious that the author of the list of questions is in sympathy with them, it was his constant endeavor in recording the answers to quote both negative and affirmative comments, and to eliminate all personal bias. Therefore it is expected that this report will be accepted as a compilation of the expressed opinions of dental teachers in nearly all the colleges and practitioners in most parts of the United States and eastern Canada.

Summary of Answers, with Conclusions.

Question 1—*Do you recognize normal occlusion as the basis of all branches of dental practice?*

"Yes," answered by 112. "No," by 3. "Yes, with minor exceptions," by 4. "Yes, of operative and prosthetic dentistry," by 4. Unanswered by 18.

(Quotations from answers.)

N. S. Hoff: "Fundamentally essential, more so than any other."

S. H. Guilford: "By no means, but it is important in all."

C. N. Johnson: "Normal occlusion is a fundamental requisite."

H. L. Wheeler: "Desirable, but not always necessary for efficiency."

W. B. Dunning: "As an ideal basis, not always attainable."

M. L. Rhein: "All branches that occlusion, but there are many that

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come under this head, therefore I think the question should be modified."

H. E. S. Chayes: "Normal occlusion, as usually understood, is but one of the essentials which we must work for. The basis of all dentistry is, in my opinion, a macroscopy of the maxillary apparatus which would in all essentials be acceptable to the human organism. This means much more than normal occlusion."

Conclusion (drawn from total of answers). Normal occlusion is the basis of the practice of dentistry.

QUESTION 2—*Do you consider the full complement of natural teeth or their anatomic duplicates as essential to normal occlusion?*

"Yes," answered by 120. "No," by 9. "Yes, third molars excepted," by 9. Unanswered by 3.

(Quotation from answers.)

N. S. Hoff: "Assuredly, almost as essential as every cog in the wheels of a watch."

Conclusion. The full complement of natural teeth or their anatomic duplicates is essential to normal occlusion.

QUESTION 3—*Do you consider the making of "study models" for diagnosis and outlining of treatment as being essential to the most efficient dentistry?*

"Yes," answered by 100. "No," by 3. "Not in pathologic work," by 2. "In most cases, yes," by 6. "When restoring occlusion," by 9. "Very helpful, but not always necessary," by 14. Unanswered by 7.

(Quotations from answers.)

N. S. Hoff: "No diagnosis is complete without accurately made articulated models."

E. H. Smith: "Yes, and have so practiced."

F. B. Moorehead: "Yes, with reasonable limitations."

S. E. Davenport: "Yes, an excellent plan, and one I have used in important cases for many years."

H. M. Semans: "Yes, have been doing so for some time."

W. C. Deane: "Emphatically, yes."

E. G. Parker: "Yes, by far the safest and most accurate results are obtained by so doing."

C. Barton Addie: "Imperative."

L. Meisburger: "Study models are absolutely necessary in studying case in hand and determining treatment to be undertaken. It makes for intelligent as well as efficient dentistry."

S. W. Bowles: "Yes, decidedly."

E. A. Bogue: "Have so considered it for twenty-five or thirty years."

R. G. Hutchinson, Jr.: "It is unnecessary, in my opinion, to make study models for diagnosis and outline of treatment in connection with pathological conditions having their origin in malocclusion. It would be most desirable to do so, however, when demonstrating, or teaching those who are inexperienced."

H. E. Kelsey: "Models of any patient who remains in the hands of the same operator are instructive from the beginning, and later become almost invaluable."

Conclusion. Study models are essential to most efficient dentistry—(*a*) when considerable areas of occlusion have to be restored; (*b*) when malposed teeth have to be moved into normal position; (*c*) models for study and record should invariably be made when there is the least doubt as to the proper procedure.

QUESTION 4—*What percentage of so-called pyorrhea do you consider to have had its inception in malocclusion (this implies also defective approximal contacts)?*

Percentages.							
100%	ans. by	....	2	60%	ans. by	.....	2
95"	" "	....	2	50"	" "	.....	15
90"	" "	....	6	30"	" "	.....	2
80"	" "	....	2	25"	" "	.....	7
75"	" "	....	8	20"	" "	.....	3
70"	" "	....	2	10"	" "	.....	5

	Answered by	Percentage for estimate.
"Large majority,"	6	75
"Majority,"	3	60
"Large percentage,"	16	50
"Important factor,"	6	50
"Small percentage,"	6	10
"Not a factor,"	3	

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On this basis—"70 per cent. and more," answered by 31; "50 to 70 per cent.," by 42; "30 per cent. or less," by 23.

(Quotations from answers.)

Mallory Catlett: "I am confining my work almost exclusively to oral prophylaxis and pyorrhea, and in the past eight years have had very few cases come under my observation without malocclusion being associated. It is so almost invariably the case that the exception is seen very seldom. I am saying 90 per cent. in my answer to question 4, but I firmly believe that a greater percentage have their inception in malocclusion."

E. A. Bogue: "The bulk of all that occurs among young or middle-aged persons."

J. W. Beach: "I have said in my answer to number 4 that at least 50 per cent. of pyorrhea and contributing conditions are due to malocclusion. My personal conviction is that 85 per cent. comes nearer to a correct statement. I believe that you will agree with me that we can do very much toward a cure of pyorrhea with a merry little grindstone."

H. M. Semans: "Very high; can't conceive of so-called pyorrhea in normal mouths if proper chewing is done."

R. G. Hutchinson, Jr.: "It is impossible for me to state exactly what percentage of so-called pyorrhea I believe has its inception in malocclusion, as I have not tabulated my cases on that point, but I will say that I have rarely seen a case of pyorrhea in which malocclusion is not the most important factor. Nearly all infections of the oral tissues are dependent for their existence on trauma, and I believe in the vast majority of cases trauma will be found to be caused by malocclusion, especially when a very deep pocket exists or the tooth is perceptibly loose."

Conclusion. Malocclusion is the most important causative factor in so-called pyorrhea, and conversely, pyorrhea seldom is to be found when the teeth are in normal occlusion and in proper use.

QUESTION 5—*Do you recognize a gradual retrogressive change as taking place in the relations of the teeth and arches when in malocclusion?*

"Yes," answered by 114. "No," not answered by anyone. "Large percentage, but not all cases," answered by 17. Unanswered by 10.

Conclusion. A gradual retrogressive change is taking place in the teeth and arches when in malocclusion. The rapidity and degree of this change will vary greatly in different individuals according to histologic constituents, but it always takes place in some degree.

QUESTION 6—*Do you consider this change to reach the minimum in proportion as the occlusion approaches normal?*

"Yes," answered by 120. "No," by 3. "Possibly," by 3. Unanswered by 15.

(Quotations from answers.)

G. W. Dittmar: "Yes, if tonsil and nasal conditions do not interfere."

G. S. Butler: "When occlusal planes are in normal relations there should be no change."

Conclusions. (*a*) The retrogressive change which takes place in the relations of the teeth and arches reaches the minimum in proportion as the occlusion approaches normal. (*b*) When the teeth are in normal occlusion there should be no change other than that which is inevitable and is expressed in the term "old-age tendency of the human body," except in rare cases of grave constitutional origin.

QUESTION 7—*Do you believe it best to zealously conserve the third molars that have erupted and taken practically normal positions?*

"Yes," answered by 88. "Yes, when in occlusion and sanitary," by 36. "Yes, except where there is pulp involvement," by 6. "Yes, except when prone to caries," by 3. "No," by 4. Unanswered by 4.

Conclusion. The third molar should be zealously conserved when in occlusion

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and it may be maintained in a state of health.

QUESTION 8—*Give briefly your reasons for your answer to No. 7.*

"Greater masticating surface and crushing force," answered by 57. "For the purpose of maintaining tight contacts," by 27. "May be needed as abutments later," by 12. "To preserve the maxillary tuberosity and contour of face," by 6. Reasons not given by 39.

(Quotations from answers.)

C. N. Johnson: "Anything that will tend to 'loosen up' the contacts will lessen the integrity of the arches."

E. A. Bogue: "The support of third molars is greatly needed with advance of years to brace up and sustain forward teeth."

A. M. Wright: "Their presence has a tendency to elevate the arches of the throat and give better quality to the voice."

A. J. Bush: "They are the final factors in the scheme of development of the jaws and face, and are essential to the establishment and maintenance of harmony."

Ellison Hillyer: "Extraction always has a negative influence on the integrity of the arch."

M. L. Rhein: "There is more than normal position demanded to advise retention. There is not a more difficult matter to decide, as extraction is often beneficial."

D. M. Cattell: "Exceptions: Too crowded; heavy folds of mucous membrane; imperfect structure, and malposition."

H. E. S. Chayes: "(*a*) As an aid to mastication. (*b*) As an aid to circulatory re-stimulation in the mouth by virtue of tooth movement during mastication. (*c*) As a buttress of defence for the gingival tissue around the second molar, dynamically and occlusally considered. (*d*) As a matter of general principle not to disturb but rather to conserve normal relations in the oral cavity. (*e*) Never to remove anything that is good and helpful unless I can substitute something better. There are several other good reasons, but the above are sufficient."

G. H. Wilson: "For development of jaws and supports for approximal contacts."

H. E. Kelsey: "The third molar is as important in an arch in which it can erupt normally as any tooth."

Conclusions. Third molars when in normal healthy relations serve—

(*a*) For the purpose of maintaining tight approximal contacts. This becomes progressively more necessary with advance of years.

(*b*) To afford greater masticating surface in themselves and to increase the collective crushing force of the teeth.

(*c*) For abutments if needed.

(*d*) For the protection of supporting structure about the second molar.

QUESTION 9—*In cases where teeth have been extracted and the adjoining teeth have partly closed-in the space, do you consider it best "as a principle" to move the adjoining teeth into their normal positions before placing an artificial substitute?*

"Yes, as a principle," answered by 51. "Yes, as a principle with exceptions," by 58. "In youth only," by 7. "No," by 14. Unanswered by 11.

(Quotations from answers.)

E. A. Bogue: "It depends entirely upon the age of the patient. If very young, yes; if middle-aged, rarely; if old, no."

J. H. Prothero: "Yes, in practically all cases except where the regaining of the lost space would result in disturbing the established occlusion to any great extent."

J. P. Ruyl: "As a general thing, no, except in cases where the anterior teeth have been lost and the space is not wide enough to admit the same number of artificial ones. Then to get the desired artistic effect I would move the anterior ones."

G. H. Wilson: "Yes, but only in youth."

F. L. Stanton: "As a principle, yes, although there are many exceptions."

Gladstone Goode: "Yes as a principle, but unwise much beyond youth."

A. J. Bush: "Yes, during developmental period."

E. H. Smith: "Depends entirely on the age of the patient."

Conclusions. (*a*) "As a principle" governing best practice, it is imperative

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that, in youth, teeth that have drifted because of the loss of an adjoining tooth be moved into normal position prior to the placing of an artificial substitute. (*b*) In middle life and with advancing age, each case more and more becomes a law unto itself, but when efficient and artistic demands dictate, it should be done, except with invalids and the aged.

QUESTION 10—*If not, why? Contra-indications.*

"Age," answered by 26. "Health," by 6. "Unadvisable in advanced age," by 5. Unanswered by 104.

(Quotations from answers.)

W. C. Deane: "My practice is in each individual case to secure a set of radiographs, study models, and a history of the case before definitely deciding upon the course of treatment."

M. L. Ward: "If the patient has passed maturity, I am emphatically against it, if the teeth are to be used for bridge abutments, either fixed or removable, in most cases, because of the difference between the result obtained by so doing and what may be done by other means will not warrant it."

G. H. Wilson: "Too much tax on the organism, and permanence too doubtful."

T. A. Trumble: "Attachment would be weakened by moving, while good articulation can be obtained in an artificial substitute."

F. A. Delabarre: "Beyond twenty-five years of age expediency governs the decision; the age, general health, time required, etc., are the determining factors."

E. A. Bogue: "If the inclining teeth were brought to an upright position they would be too long, would strike too forcibly, and would sooner be lost."

QUESTION 11—*What means do you employ for producing anatomic occlusion in small areas, as in a single crown and in bridge work?*

"For single crowns, 'squash' bite and when finished corrected in the mouth," answered by 22. "For bridge work, casts mounted on anatomic articulator," by 36. "For single crowns and bridges, the Oscillating Bite," by 9. Unanswered by 73.

(Quotation from answers.)

H. E. S. Chayes: "Occluding models of entire jaws, and finally corrected in the mouth."

Conclusion. The "Oscillating Bite" as a means of producing anatomic occlusion in limited areas, as given by the writer in a clinic before this society at the previous two meetings, has not been generally understood. Therefore, and because a description of this method has not appeared in print, the technique will be given as the concluding part of this report.

QUESTION 12—*In making full dentures, do you consider the establishment of the correct position of the models to the point of motion in the articulator as essential to most efficient results?*

"Yes," answered by 107. "No," by 5. "Means at hand is not accurate," by 1. Unanswered by 28.

(Quotations from answers.)

G. H. Wilson: "Most assuredly and unequivocally, yes."

E. E. Belford: "Most emphatically."

J. H. Prothero: "Absolutely necessary."

G. B. Snow: "Most certainly, yes. The correct position of the models in the articulator is very essential."

Ellison Hillyer: "Absolutely."

J. P. Ruyl: "It is essential in order to get a proper anatomical articulation, to place the models in a correct position in the articulator. This result can only be obtained by the condyle and lateral path register or face-bow. The finished dentures must remain stable at any and all movements of the jaw."

Conclusion. In making full dentures it is essential to the most efficient result that the correct position of the models to the point of motion be established in the antagonizor.

QUESTION 13—*Do you regard the use of the face-bow or some one of its modifications as essential to this?*

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"Yes," answered by 90. "No," by 15. Unanswered by 36.

(Quotations from answers.)

H. L. Wheeler: "Yes, emphatically."

Ellison Hillyer: "Absolutely."

S. H. Guilford: "Face-bow very essential."

R. Murray: "Have had such universal success in its use that I consider it essential."

H. C. Harkrader: "I most certainly do."

G. B. Snow: "Yes. Until the face-bow was invented the matter of placing the models in the articulator was simply guesswork, and they were more likely to be wrongly placed than otherwise."

J. H. Prothero: "There are two fundamental factors of vital importance in the construction of anatomic and scientific dentures that cannot be ignored without lessening the quality and efficiency of the substitutes. The first is mounting the casts in correct horizontal plane relationship to and radial distance from the rotation centers of the occluding frame. This is accomplished by means of the face-bow or some other similar device. The second consists in registering the pitch of the condyle paths of the patient, and setting the condyle paths of the occluding frame at corresponding pitch. This may be accomplished by two somewhat different methods. First by means of the Snow appliance and Christensen's method of condyle registration, and second by means of the more elaborate Gysi apparatus, called the 'condyle register.'"

G. H. Wilson: "Yes. The Snow face-bow is the one and only instrument of value in making measurements for mounting the case upon the antagonizer. The face-bow establishes two things—(1) the relations of the occlusal plane to the condyle, and (2) the perpendicular of the triangle. These statements will require a terse elaboration:

The mandible is a lever of the third class, and its fulcrum end is variable in form but of an irregular elongated globular shape. It is separated from the fulcrum by a cartilaginous cushion and two bursal sacs. It is incased in and attached to the glenoid fossa by a capsular ligament. Its muscular attachments have power to move it an appreciable distance in various directions—as forward, outward, inward, upward, and downward, also in the direction of the resultant of certain of these directions. Therefore it has no fixed center or axis of movement, but is a very adaptable joint. The closing movements, but not the opening movements, of the mandible are of interest to the dental scientists, and this only when two or more cusps of teeth impinge while moving into natural occlusion. Necessarily these movements are slight and inaccessible, therefore cannot be measured, but can be sufficiently accurately reproduced for any practical purpose.

It is universally recognized that the form of the mandible is based upon the triangle, that the base of the triangle is from the crest of one condyle to the crest of the other, and that the apex is the normal mesial incisal angle of the central incisor teeth, hence the perpendicular of the triangle is in the sagittal plane and is at right angles to the base-line. Therefore the working triangle is equilateral, while the anatomical triangle may be equilateral, isosceles, or scalene. The perpendicular of the triangle is easily obtained by the Snow face-bow, and is the only necessary and reliable measurement.

There are no fixed rotary centers in the temporo-mandibular joint, but in the closing movements of the mandible its gyrations are directed by the cusps and planes of the teeth, either natural or artificial. Therefore there are several rotary centers, but all outside of the joint. It has been demonstrated that in the horizontal rotary movement of the closing mandible the rotary center is in the sagittal plane, and may be upon the base-line or any distance back of it. Dr. Rupert E. Hall of Houston, Texas, has demonstrated that if the rotating center is placed at the same distance back of the base-line that the apex is in front of it, perfect working results may be obtained. Norman G. Bennett of England has demonstrated the lateral mandibular movement. As this movement is the segment of a circle with its rotating center vertical in the sagittal plane and governed entirely by the angles and planes of the teeth, it follows as a logical sequence that this rotation center may be established at the will of the operator. Whereas these two movements—horizontal and vertical—are the two movements of mastication, and as a forty-five degree angle will produce the greatest efficiency in mastication, Dr. Hall has embodied these and other valuable principles in an instrument soon to be placed upon the market, which the writer confidently believes is destined to revolutionize prosthetic dentistry."

Conclusion. The Snow face-bow or some one of its modifications is essential to the establishment of the correct position of the models to the point of motion in the antagonizer.

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QUESTION 14—*Do you consider the reproduction of the marginal, triangular, and oblique ridges, together with well-defined angular grooves and sulci, as an essential factor in restoring efficient occlusion?*

"Yes," answered by 104. "Yes partly," by 9. "No," by 6. Unanswered by 22.

(Quotations from answers.)

H. E. S. Chayes: "Yes, more than that. I consider the reproduction of the marginal triangular and oblique ridges, with the perfect continuity of surface at point of apposition between natural tooth and restoration, a very great if not the greatest factor in the prevention of traumatism of the gingival tissues."

W. T. Chambers: "Marginal, triangular and oblique ridges, yes! angular grooves and sulci, no!"

W. S. Rose: "I believe it well to reproduce these anatomical features, but there is not the same fundamental necessity as for correct interproximal areas."

G. B. Snow: "The production of grooves and sulci in the grinding surface of artificial teeth to correctly meet the cusps of their opponents certainly adds very much to their efficiency in mastication, and is a matter which should never be overlooked."

Conclusion. (*a*) The reproduction of marginal, triangular, and oblique ridges *in harmony with those in the mouth,* together with properly placed contact points and well-defined angular grooves and sulci, is essential in restoring most efficient occlusion and masticating power. (*b*) In making artificial dentures the reproduction of these anatomic features is also essential to the most efficient result.

QUESTION 15—*Do you consider that in the restoration of lost occlusal areas an accurate anatomic counterpart is necessary to the retention of teeth that have been moved into normal occlusion?*

"Yes," answered by 119. "No," by 3. Unanswered by 19.

(Quotation from answers.)

S. E. Davenport: "I consider the establishment of normal occlusion as the greatest and most needed method for the retention of teeth which have had their positions changed."

Conclusion. In restoration of lost occlusal areas an accurate anatomic counterpart is necessary to the retention of teeth that have been placed in normal occlusion.

SUMMARY OF CONCLUSIONS.

(1) Normal occlusion is the basis of the practice of dentistry.

(2) The full complement of natural teeth or their anatomic duplicates is essential to normal occlusion.

(3) Study models are essential to most efficient dentistry—(*a*) When considerable areas of occlusion have to be restored. (*b*) When malposed teeth have to be moved into normal position. (*c*) Models for study and record should invariably be made when there is the least doubt as to the proper procedure.

(4) Malocclusion is the most important causative factor in so-called pyorrhea, and conversely, pyorrhea seldom is to be found when the teeth are in normal occlusion and in proper use.

(5) A gradual retrogressive change is taking place in the teeth and arches when in malocclusion. The rapidity and degree of this change will vary greatly in different individuals according to histologic constituents, but it always takes place in some degree.

(6) The retrogressive change which takes place in the relations of the teeth and arches reaches the minimum in proportion as the occlusion approaches normal. When the teeth are in normal occlusion there should be no change other than that which is inevitable and is expressed in the term "old-age tendency

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of the human body," except in rare cases of grave constitutional origin.

(7) The third molar should be zealously conserved when in occlusion and it may be maintained in a state of health.

(8) Third molars when in normal healthy relations serve—

(*a*) For the purpose of maintaining tight approximal contacts. This becomes progressively more necessary with advance of years.

(*b*) To afford greater masticating surface in themselves and to increase the collective crushing force of the teeth.

(*c*) For normal development and harmonious contour of the face.

(*d*) For abutments if needed later.

(*e*) For the protection of supporting structure about the second molar.

(9) (*a*) "As a principle" governing best practice, it is imperative that, in youth, teeth that have drifted because of the loss of an adjoining tooth be moved into normal position prior to the placing of an artificial substitute. (*b*) In middle life and with advance of age, each case more and more becomes a law unto itself, but when efficient and artistic demands dictate, it should be done, except with invalids and the aged.

(11) The Oscillating Bite as a means of producing anatomic occlusion in limited areas, as given by the writer in a clinic before this society at the previous two meetings, has not been generally understood. Therefore and because a description of this method has not appeared in print the technique will be given as the concluding part of this report.

(12) In making full dentures it is essential to the most efficient result that the correct position of the models to the point of motion be established in the antagonizer.

(13) The Snow face-bow or some one of its modifications is essential to the establishment of the correct position of the models to the point of motion in the antagonizer.

(14) (*a*) The reproduction of marginal, triangular, and oblique ridges *in harmony with those in the mouth,* together with properly placed contact points and well-defined angular grooves and sulci, is essential in restoring most efficient occlusion. (*b*) In making artificial dentures the reproduction of these anatomic features is also essential to most efficient results.

(15) In the restoration of lost occlusal areas, an accurate anatomic counterpart is necessary to the retention of teeth that have been placed in normal occlusion.

Description of the Oscillating Bite.

The Oscillating Bite provides a simple and accurate means for producing anatomic occlusion in restoring limited areas ranging from—(*a*) A large occlusal inlay by indirect method. (*b*) A single crown, either of metal or porcelain. (*c*) A bridge, either fixed or removable, which involves the restoration of a considerable area of occlusion. No special apparatus is needed. Instead of taking the customary "squash" bite, which reproduces only the occlusal ends of the opposing teeth in vertical closure, this bite is made with the jaws in movement as in mastication. Thus the opposing teeth displace the wax of the bite so as to form inclined planes that will provide not only for *contact* of the teeth, as with the usual "squash" bite,

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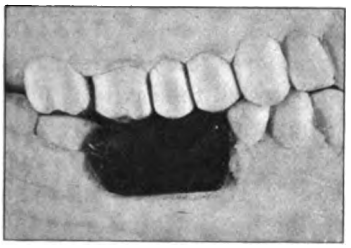
but in addition the clearance and harmony of inclined planes necessary to the normal gyrations of the teeth in mastication.

The progressive technique for taking the bite for a *bridge* will first be outlined: The abutments of the kind preferred for the case having been prepared, are temporarily fixed in the mouth. First a firm base is made upon the occlusal part of which the soft wax is later placed. Modeling compound in stick form has been found best for this.

FIG. 1.



Shows the firm foundation of modeling compound in place in the mouth, after having been nicely fitted and trimmed so that antagonizing teeth just clear.

A piece somewhat longer than the space is warmed in a Bunsen flame, and when soft pressed with the thumb and fingers into the space, well over the ridge of jaw and about the abutments. It is essential that this foundation of compound fit so snugly that when trimmed and finally chilled there shall be no movement. The compound is shaped so that the opposing teeth clear nicely. (See Fig. 1.) The compound is now removed and wax melted in the flame is quickly dropped upon the occlusal part to the depth of about 3 mm. It is now replaced in the mouth and pressed firmly to position. The jaws are now closed and moved to the right and left, and protruded as in mastication, but not beyond. The jaws may be guided by noting the median line of upper and lower teeth and having the lateral movement approximate 2 to 3 mm. or about half the width of a lower central incisor. The bite is removed, chilled, the excess wax trimmed, and the impressions of the teeth filled with soft wax, again returned to the mouth, and the same procedure repeated. There must be no movement of the foundation of compound. (See Fig. 2.) It is again removed, trimmed, the surface oiled or thinly coated with vaselin, and replaced. The patient is instructed to close tightly, pressing the bite into firm position while the plaster or similar material for the impression is being mixed. The bite is left in the mouth while the impression is taken, and becomes a part of it. The plaster is permitted to become somewhat resistant as it is pressed to place, so as to prevent the bite from being raised by the elasticity of the gum tissue. This is very important. The impression is removed and the abutments placed in it. (See Fig. 3.) It is varnished and the cast made. When hard, the impression material is trimmed and chipped away,

FIG. 2.

a *b*

a, Shows the oscillating bite ready for a thin coating of oil or vaselin preparatory to its replacement in the mouth for the impression.

b, Shows a bite of the same case taken in vertical closure only. (Note the difference in the extent of wax displacement.)

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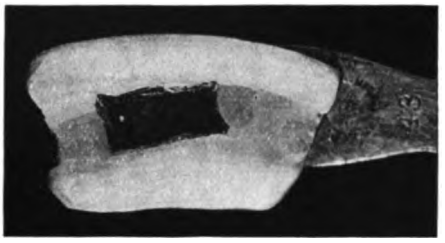
leaving the cast with the abutments and bite in place on it. Care must be exer-

FIG. 3.



Shows the impression removed with bite forming a part of it.

cised not to mar the wax. The oil or vaselin previously applied makes sepa-

FIG. 4.

Shows the cast with bite in place, after the impression has been carefully trimmed and chipped away.

ration from the bite much easier. (See Fig. 4.) This is now mounted in a crown

FIG. 5.

Shows the case mounted in a suitable articulator having vertical motion only.

articulator of suitable size in the usual way. A close-jointed articulator with vertical movement only is necessary. (See Fig. 5.) When the plaster is set, the bite is removed, and the case finished as desired. The occlusal surfaces of the artificial substitutes are carved or ground as the case may require to accurately fit the inclined planes of the bite, and the angular grooves and sulci then added. The bucco-lingual measurement will correspond with that of the abutments and adjoining natural teeth.

If for a *shell crown,* the oscillating bite is taken by replacing the band in proper position, filling the occlusal end to excess with wax, and have the patient perform lateral and protrusive movements.

If for a *large inlay* to be made by the indirect method, the cavity is filled with compound, which is carefully fitted and trimmed so that the antagonizing tooth will clear. It is removed, thoroughly chilled, the wax melted and dropped on the surface, replaced in the cavity, and the oscillating bite taken, special attention being given the contact point. It is removed and laid aside until the die is made, then placed in it and mounted. The bite is removed and casting wax is carved to the bite.

If for a *porcelain dowel crown,* either to be carved for occlusion and baked, or if a stock tooth is to be ground to occlusion and adapted to the root-end by other means, the dowel is fitted and to the root-end is adapted thin platinum—36 gage or thinner—and soldered to the dowel. This is placed on the root and a foundation of compound is fitted into the space and well over the lateral walls of the adjoining teeth. It is shaped so that the antagonizing cusps clear, is then removed, chilled, and hot wax dropped on to the occlusal part, and the oscillat-

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ing bite made. This is left in place while the impression is taken, and becomes a part of it. Proceed further according to the description of completing a bridge.

If absolute anatomic occlusion is not obtained, the failure may be due—(*a*) To movement of the compound foundation in taking the bite in the wax. (*b*) To raising of the bite when taking the impression. (*c*) To failure to nicely carve or grind the occlusal area.

Having succeeded in these essentials, an absolute anatomic restoration must be produced.

[The report also embraces a LIST OF CONTRIBUTORS, with a list of the states from which replies were received, also of the colleges represented by replies coming from dental instructors.]

Your Correspondent desires, in the name of the society, to express gratitude to all who so kindly contributed to the report, and to warmly acknowledge assistance from Dr. Frank A. Gough and Dr. Geo. H. Wilson.

DISCUSSION.

Dr. E. A. SMITH, Rome. I feel that the Correspondent is to be especially congratulated on his selection of questions for his report. The answers which have been brought out have been so thorough and cover the ground so well that there is but little to discuss. I believe the Correspondent is warranted in all of his conclusions with the exception of one or two, and of these I will speak.

With regard to question 1—"Do you recognize normal occlusion as the basis for all branches of dental practice?"—I like the answer given by Dr. Dunning, "As an ideal basis, not always attainable." As to question 4—"What percentage of so-called pyorrhea do you consider to have had its inception in malocclusion?"—it is undoubtedly true that a large majority of cases of pyorrhea are due to malocclusion, but this is not always the case. The question as to a full complement of teeth being essential to normal occlusion, I think, is very difficult to answer, for the reason that we see so few cases of normal occlusion, and I doubt if I have seen in practice fifty cases of absolutely normal occlusion. With regard to question 7—"Do you believe it best to conserve the third molars which have erupted and taken practically normal positions?"—I can see but one answer, considering the way that question is asked. We must, of course, conserve them if they have erupted and taken their normal positions. If, however, the question were, "Would you always conserve the third molar?" I would say, "No," for the following reason: Recently a young lady who has been under my care since childhood, and who is now attending Wellesley College, came to my office for dental work. Up to the time of eruption of the third molars she had a most perfect occlusion, but when the lower third molars began to erupt I noticed a very much changed condition. There was a

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large amount of inflamed tissue and much pain, which I attempted to alleviate. But in my effort to preserve the third molars I found that the occlusion was becoming distorted. I removed these molars, and it is difficult for me to imagine that in her later years these molars will be necessary to retain the approximal spaces.

With the balance of the questions I fairly agree. I imagine that two-thirds of those present will agree with most of the reporter's conclusions, but the question which later came to my mind is, How can we obtain perfect occlusion? The restoration of the occlusal surfaces is not so difficult in these days of casting, but in cases of orthodontia I believe it to be a more serious matter. What is the man to do who is practicing in a smaller town, perhaps fifty miles from an orthodontist, and who has not the ability to do orthodontia, and most of whose patients are not able to go to the orthodontist in the city or to pay his fees. Imagine such a case: A patient presents at his office with one of the most common irregularities, viz, the canines outside the arch, and perhaps the laterals and bicuspids are touching. This operator may know the classification according to Angle, and perhaps know how it should be regulated, but he also knows that the patient is the child of a man who is earning twelve or fifteen dollars a week, and who cannot send the patient to the city to an orthodontist. He has only two alternatives. He may send the girl to the orthodontia specialist fifty miles away, at a cost of five or six hundred dollars to the patient, or he may treat the case himself. If he is a philanthropist, or expects to inherit money, he will probably treat the case for two hundred dollars. What is the result? Because of the expense necessary, the girl will for the rest of her life retain this condition, which will not only be unsightly but will eventually grow worse. Or he may extract the first bicuspids—I am not advocating this procedure, but, if so, has he not done the best for the patient under the circumstances? In later years the boy or girl may be in different circumstances, and go to another dentist, who immediately asks who extracted these teeth, and when he is told, condemns the first dentist without taking into consideration the circumstances. I am dilating upon this feature for one reason: When cases come into our hands, we should consider the situation, realizing that the man who is doing the best dentistry is the one who is doing the greatest good for the greatest number of people. This is not any reflection on Dr. Waugh's statement that we should strive for the ideal, but it is not always possible to attain it.

Dr. Morton Van Loan, Albany. It is very difficult for me to discuss this report critically, because I am in full sympathy with the ideas and ideals of the Correspondent. While I feel that many of the conclusions of this report, especially if carried to the extreme, are too idealistic to be practicable for the majority of dentists, still everyone, no matter what his position in dentistry, should have these ideals before him, in order that he may progress. He should feel that progress is the best condition under which anyone can labor, both from a financial standpoint and for the building of character.

As to the first question asked by the Correspondent, I should suggest that it read, "Do you recognize normal occlusion as a basis of all branches of den-

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tistry, looking to the preservation and restoration of health, from a dental standpoint?" for I feel that the dentist should look after the preservation of the teeth as a means for the preservation and restoration of health.

To question 2 I should answer, Yes. To question 3 I should answer, Yes. To question 4 I would like to say that the Correspondent's conclusions seem to be rather exaggerated. Taking the percentages he received and averaging them, the result would make a little over fifty per cent. who believe that pyorrhea has its inception in malocclusion. Personally I do not like the wording of question 4, because from my conception of pyorrhea I feel that the question should be worded, "What percentage of so-called pyorrhea do you consider to have had malocclusion as a contributory factor in its inception?"

I do not mean to attempt to go into the causes of pyorrhea, but it seems to me that malocclusion can only have a contributory effect upon this disease, but is not the direct cause, because we find very few mouths with perfect occlusion, and yet hundreds of these mouths exhibit no pyorrhea.

While we feel that in many cases of pyorrhea the disease would not have been caused had it not been for the malocclusion, still other systemic conditions must have brought about a predisposition, so that malocclusion, or filth, or traumatism can make their influence appear to be the real cause of the pyorrhea. We find a very wide difference of opinion as to the cause of pyorrhea, and I feel that we must determine first the one or several conditions which bring about pyorrhea, before we can obtain a consistent result in its cure.

In regard to percentage, H. M.. Semans says, "Very high; can't conceive of so-called pyorrhea in normal mouths, if proper chewing is done." This statement contains a little joker. Teeth must be in normal occlusion, and patients must use them properly and thoroughly, else a favorable systemic condition for the inception of pyorrhea will be provided. Therefore we must not only obtain normal occlusion, but we must instruct the patient how to use normal occlusion properly.

In his conclusions, the Correspondent says that malocclusion is the most important causative factor in so-called pyorrhea, and conversely, pyorrhea is seldom to be found when the teeth are in normal occlusion. I would also like to emphasize the importance of proper mastication and proper diet, which is being more and more generally recognized.

By way of illustration, I would cite the case of a little patient who, though not a delicate child, suffered from coughs and cold continuously; finally her kidneys were suspected, and she was put on a diet, without meat and potatoes and with little sugar. As a consequence, her condition is much improved and the cough has entirely disappeared.

To question 5 I would answer, Yes. To question 6, Yes. To question 7, Yes. To question 8, I would say that a dentist's first duty is to preserve normality. To question 9, If possible, yes. This also covers question 10. To question 11, Oscillating bite. To question 12, Yes. To question 13, Yes. To question 14, Yes. To question 15, Yes.

Dr. ABRAM HOFFMAN, Buffalo. First of all I want to compliment the Correspondent upon his work, and to express my appreciation of his having brought the subject of normal occlusion once

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more to our attention, as this is a subject which is perhaps not as fully appreciated by all of us as it should be. The conclusions presented should be looked upon with much favor, as they voice the opinions of some of the best practitioners of dentistry.

It is somewhat difficult to discuss a report with which one is in entire accord, and in which the replies to the questions are practically all of the same thought. Of the 260 letters sent out, 138 answers were received; that is, slightly more than one-half of the men to whom the letters were addressed answered them. Of the 138 there were 120 who sent in what might be termed favorable or affirmative answers, which is a large enough percentage to warrant our accepting the conclusions as they have been given by the Correspondent.

I was very much interested in the report on questions 3 and 4, and hope that the next speaker will tell us why he does not approve of study models, when their use is almost universally advised. It seems to me that any practitioner can benefit and improve upon his restorations, appliances, etc., if he has study models at hand, and that in the treatment of pyorrhea their use would be of very great value in studying the different points of contact, forces, etc. In this connection I might mention that models may be mounted upon the new Snow articulator with the face-bow in such a manner that the antagonizing surfaces of the teeth, the alveolar surfaces, etc., will bear identically the same relation to the hinge of the articulator that they bore to the temporo-mandibular articulation—hinge—in the living subject. This is a very great advantage and of much importance; the technique for accomplishing these results is very simple.

I was pleased to read Dr. Bogue's answer to question 10 as to the advisability of moving teeth that have drifted as a result of extraction, and I think he has made a strong point in advising that in moving such teeth it is well to be careful, or we may elongate the tooth and open the bite, causing much annoyance and the probable ultimate loss of the tooth.

With reference to questions 12 and 13, I feel that the face-bow is one of the most important aids that we have in prosthesis. Its importance and advantage is apparent not only in full cases, but in partial cases as well. It is interesting to note Dr. Wilson's emphatic answer to this question.

With reference to the restoration of marginal ridges, I feel that the strong point is the fact that these ridges, sulci, etc., must be developed or worked out so that they are in absolute harmony with the other teeth remaining in the mouth. There is no question as to the advisability of reproducing these ridges and sulci. It is only a question as to the extent to which they should be developed.

Dr. R. G. HUTCHINSON, Jr., New York. I want to repeat what I said to Dr. Waugh in my reply to his letter, and what he was too modest to mention, namely, that I wished to congratulate him on the selection of the subject for his report: "To my mind, if it receives the attention it deserves, it will mark a new era in the practice of dentistry." I have been of this opinion for a long time, and it gives me peculiar pleasure to have this subject brought to the attention of the profession at this time.

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During the past five years of routine practice I have been more and more deeply impressed with the imperative necessity of taking into consideration malocclusion in the treatment of oral pathological conditions. Malocclusion may not be responsible for the inception of pyorrhea in all cases, but when the pathological conditions have reached an advanced stage, malocclusion is a most important factor. Of course, other mechanical injuries to the soft tissues will bring about a pathological condition, if neglected, and if such injuries have occurred, the resultant conditions are not necessarily attributable to malocclusion.

With regard to question 1, I would like to enlarge a little upon the reason why I believe occlusion to be the basis of all dental practice. I would prefer, however, to state it this way—that malocclusion may be, and in the majority of cases is, the basis of all pathological conditions, the cause, direct or indirect, of all lesions of the oral cavity involving the teeth and their environment. Malocclusion may be general or individualized. In the first place, general malocclusion is conducive to the establishment of unsanitary conditions. It is most difficult for children to keep their mouths clean or in a relatively sanitary condition at best, but when the teeth are in malocclusion or malposition, lodging-places are offered for vast quantities of food débris, which furnish breeding-places for bacteria. This is the first factor conducive to the establishment of disease. The next factor in malocclusion is that it is impossible for the organs to perform their normal function; the children do not acquire the habit of masticating food properly, in fact it is impossible for them to do so. In order to have a perfectly normal and healthy organ, that organ must perform its function. When function is not properly performed there is capillary stasis, and an accumulation of toxins results. If the toxic matter is not carried away, and the tissues do not receive proper nourishment for the upbuilding of the cells, the result will be degeneration of the tissues, with consequent low resistance. The third factor in malocclusion is that in the performance of the act of mastication there is greater pressure at certain points than at others, and the effect is like having two cogwheels with the cogs of unequal length and width, or like having a building placed upon piers of unequal height; the stress will be brought to bear on the high points. There is not, necessarily, a breaking-down at once; the pressure may be mild and the tissues very resistant, but everything has its breaking-point, and ultimately there will be a breaking-down of resistance, and the establishment of a pathological condition through the presence of bacteria which under normal conditions are relatively harmless. When the mouth is normal the resistance is sufficient to withstand infection, but when the resistance is overcome, infection will occur, and in the great majority of cases it is through trauma that infection becomes established in the tissues, causing a progressive degeneration. Thus at points under excessive stress, trauma occurs, which is the starting-point of infection.

Another factor in malocclusion is the crowding of the teeth, contraction of the interproximal alveolar plates, reducing the circulation and nutrition, and making them more vulnerable to attack. All of these are reasons why I believe malocclusion to be the most important

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factor in the establishment of pathological conditions affecting the mouth.

I believe the majority of the men who have answered the questions have had particular reference to orthodontia operations. I said in my reply that I wished to be excused from answering questions except those which had to do with the specialty that particularly concerns me, and my answers were therefore made with that reservation in mind.

With regard to the second question, "Do you consider the full complement of teeth or their anatomic duplicates as essential to normal occlusion?"—generally speaking, I certainly do. In my answer to the report I said, "A full complement, with the exception of the third molars."

In regard to the matter of making study models, I believe the majority of those who answered the question have had in mind orthodontia operations, and I certainly do believe that in orthodontia procedures study models are absolutely imperative, but in the study of pathologic conditions I do not believe them to be imperative for the experienced man. The beginner can get a better idea of the contact points, the occlusal surfaces, etc., by making study models, but the operator who has had considerable experience can get a better idea of these points by studying the cusps and facets of the teeth. I am not referring to the mouths of children, because children rarely come to us for treatment of infections, but of more advanced cases, from thirty years upward. When the teeth are in malocclusion, there will be facets on them indicating where there is malposition, and in opening the mouth and studying these it is quite easy for the experienced operator to study each surface of each tooth, and find where there is need of correction by grinding. We cannot hope, except in rare instances, to correct the malocclusion in adults by moving the teeth into normal positions, but we must treat these cases in another way. One of the reporters expressed the belief that a large percentage of these cases can be treated by the use of the grindstone, and I agree with him fully. We must correct malocclusion, we must establish as nearly as possible the normal line of occlusion, first by grinding down the high points, using articulating paper to indicate the high points, and one can do this better in the mouth than with the aid of study models. One cannot, with study models, tell which tooth is loose, or in which direction the tooth will move, so well as one can by studying the mouth itself. When the teeth are brought into contact, we can watch and see where the teeth move in their sockets, and we can readily relieve these points, and then, by going through the movements which Dr. Waugh described in the construction of bridge work, again grind the high points so that in every position the stress is equally distributed. Another consideration is the restoration of convex contact points, instead of planes which have been worn down, and which bring about a lateral stress of the teeth such as Nature never intended. This can be done by grinding and observing the conditions directly in the mouth. What is the use of study models for such treatment as this? I do not believe they are necessary, except, as I stated in my answer, in teaching the inexperienced.

In regard to the preservation of the third molar, this tooth may have a function when in normal occlusion, when the mandible is large enough to accommo-

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date it properly, but when the third molar lies alongside the ramus, with the soft tissues overlapping, usually, I think, it is impossible to maintain sanitation. This applies also to the upper molars. We frequently find third molars erupting in malposition, partially impacted, and as they erupt, pressure is made on the alveolar plate, which causes resorption, and by the time that tooth erupts fully there is a deep pocket between the second and third molars. To my mind, this is one of the main reasons why we so often find pyorrhea pockets in that location. If we wish to do away with that pocket, we must remove that third molar, and vastly more good will accrue from its removal than from its retention under such conditions. When teeth have been extracted and the adjoining teeth have partially closed the space, generally speaking I believe it wise by orthodontia procedures to restore this space.

This is not a discussion of the etiology of pyorrhea, but I wish to emphasize—alluding to Dr. Van Loan's discussion—that to me it seems very plain that pyorrhea is not caused by any one factor. It is the result of a combination of factors, but, in the fewest possible words, it is infection of tissues whose resistance has been overcome. In a majority of cases, trauma is the cause of the breaking-down of resistance at that particular point where the infection has been established in an acute form, and the most common cause of trauma is malocclusion.

So important do I consider this factor that my first procedure in the treatment of pyorrhea is the correction of the malocclusion. It is worse than useless to perform a surgical operation upon tissues which continue to be exposed to stress. Such treatment would add to the injury, spread the area of infection, and render the formation of granulation tissue impossible.

Dr. WAUGH (closing the discussion). The report as given has been a compilation of what others have said in answer to my questions, and while the ample discussion has raised no leading points for rebuttal, I feel that it will be only fair to allow me the privilege of briefly expressing my personal views on a few points, even though the time is short. The aim in formulating the list of questions was to remind ourselves of the gradual change that is taking place in the teeth and dental arches, with the special object of emphasizing the fact that this change reaches the minimum in proportion as normal occlusion is established and maintained. This involves not only all *restorative* operations, but forms the basis for all dental practice, including the treatment of those pathologic conditions which tend to weaken the support of the teeth in the jaws. These diseased areas, in the vast majority of cases, have their inception in trauma which is superinduced by malocclusion, and the primary cause of disease must inevitably be removed before the part may be restored to a state of health.

Normal occlusion has for many years been recognized by a few leaders as the basis of oral health and efficiency. The wonder of it is that it has permeated the entire profession so slowly. Dr. Edward A. Bogue, when sending the answers to the questions, presented me with the reprint of a paper prepared by Dr. Isaac B. Davenport of Paris, entitled "The Significance of the Natural Form and Arrangement of the Dental Arches of Man, with a Consideration of the Changes which Occur as a Result of Their Artificial Derangement by Filling or by the Extraction of Teeth." This

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was read before the New York Odontological Society by Dr. Bogue, and published in the *Dental Cosmos* about 28 years ago.* This article contains the essential basic principles of normal occlusion, and should be read by all who are interested. There are perhaps many who have contributed to the knowledge of the subject as we understand it today, but to no one man, in my humble opinion, does the profession owe so much in this field as to Dr. Edward H. Angle. He proclaimed normal occlusion as "the basis of the science of orthodontia," and directed attention to the essential importance of the first permanent molars, aptly terming them the "key to occlusion." Dr. Angle's definition for occlusion is, "Occlusion is the normal relations of the occlusal inclined planes of the teeth when the jaws are closed." Could any definition be more simple and expressive? It does not imply an impractical ideal or a condition that may exist only in youth or at but one time in life. It means simply that the teeth meet their antagonists as nature intended, since only by this means is possible that mutual support and harmony of contact that is essential to the maintenance of health and efficiency of the dental organs. The definition applies as much to the teeth at sixty or forty as it does at twenty or at three years of age. We appreciate fully that abrasion of occlusal areas takes place as age advances, that it is much more marked in some individuals than in others, but the definition applies with equal force. If the inclined planes are within normal influence, the teeth and arches are guided to a definite, positive, normal, harmonious resting-place, without which the health and efficiency cannot be maintained for the greatest number of years. May I be permitted to urge upon all who have not already done so the serious study of the chapters on normal occlusion in Dr. Angle's "Malocclusion of the Teeth," 7th edition? It is my opinion that if local dental societies would take up as the next season's program a serious systematic study of normal occlusion, this would result in the greatest possible benefit to ourselves and our patients. It would serve as a stimulus to advanced study, and I believe there is still much to be learned about occlusion. We are apt to associate with it only the relations of the occlusal surfaces of the teeth, and perhaps the approximal contact points, but a deeper view leads to the recognition of its influence upon the positions of the roots in the jaws; the building of the alveolus for the support of the roots, the temporo-mandibular articulation and the normal histologic and anatomic make-up of the whole dental apparatus, without which normal function cannot be fully comprehended. And this knowledge of normal minute structure and normal function is essential to the most intelligent treatment of the part in disease.

In conclusion, I want heartily to thank the gentlemen who so generously prepared discussions upon the report. It was most gratifying to have so much accord and kindly expression. Naturally I had hoped for this when formulating the fifteen questions, but my fondest expectations were far surpassed, and I trust that as a result we have succeeded in proving that, if we would conserve the health and efficiency of the oral cavity for the greatest number of years, we must make "normal occlusion the basis for our individual daily practice of dentistry."

* See *Dental Cosmos* for July 1887, vol. xxix, p. 413.

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Report of the Committee on Practice.

By D. H. SQUIRE, D.D.S., Buffalo.

IN presenting this report, the committee feels that it is desirable to bring before your honorable body the most important phases of the present-day methods of dental practice. It will of necessity, therefore, deal with improved technique rather than with much new material.

PROSTHODONTIA.

In this department there are some items which are worthy of our consideration: (*a*) Neilson Impression Plaster. (*b*) Spence's Plaster. (*c*) Method of counteracting the contraction of rubber during vulcanization. (*d*) Protesyn Cement. (*e*) Attachments for retaining partial dentures.

Neilson's plaster material is especially desirable for difficult impressions, as well as all cases, because it is easily separated from the cast by immersion in boiling water.

There is a growing interest in the use of Spence's plaster for making the cast, as it sets very hard and shows practically zero in expansion, contraction, and compressibility. Its strength is four times greater than that of ordinary plaster of Paris, which is very desirable for general work.

In controlling the contraction of rubber during vulcanization, much may be accomplished by the use of Spence's plaster in the making of the cast, as well as in exercising care that no more rubber is packed into the flask than is absolutely needed for the plate. No excess should be allowed to remain, and it should be entirely removed after a most thorough boiling-down of the flask.

During the past year a substitute for continuous gum has been placed upon the market under the name of Protesyn cement. This material may be used upon either a gold or rubber base. If gold is used for the foundation, the teeth should be attached to the plate with a small amount of solder, leaving spaces between them, so that the cement may be packed from the labial to the lingual part of the denture. A triangular wire should also be carried around the rim of the plate from molar to molar, and then about half an inch back of the lingual surfaces of all of the teeth, joining the outer rim in the molar region. This gives additional anchorage for the cement, and a suitable margin for finishing.

The mixing of this cement is of the

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greatest importance, and the directions should be carefully followed. It is mixed to the consistence of dough, carried upon the spatula into all of the undercuts, and further condensed with the fingers and covered with a paraffin preparation. Then with an artist's brush No. 50, the anatomic features of the soft tissues are reproduced before the cement is set.

If rubber is used as a base, an allowance is made when waxing-up for the cement, and after vulcanization the borderlines of the rubber are made true, and sufficient anchorage is cut in the base for the retention of the cement. It should be allowed at least twelve hours in which to crystallize before being placed in the mouth. If this cement is used, the plate should be kept in water whenever it is removed from the mouth, because it cracks and bleaches if it is allowed to become dry. It is a beautiful reproduction of gum tissue and is a valuable addition to prosthodontia.

There are several important points in regard to the retention of partial dentures which have been developed and introduced by Dr. Chayes that are worthy of special mention, among them being (*a*) the coating of the model with equal parts of castor-oil and glycerin to prevent the wax from sticking; (*b*) adaptation of Solbrig's wax to the model by means of a pad of cotton dipped in warm water; (*c*) the attachment of the screw to the wax while it is still on the model; (*d*) the cutting of deep grooves on the buccal and lingual sides of the model and the pouring of the investment over the wax and into the grooves, which prevents distortion of the wax during the crystallization of the investment; (*e*) in extending the saddles in the form of a wing beyond the abutment teeth, so that a great proportion of the strain will be borne by the alveolar process instead of the root alone; (*f*) in broad saddles, the removal of a disk of wax along the lingual portion and the placing of one of larger diameter over the opening and fastened without pressing it against the cast. In the finished plate or bridge, this chamber allows for the displacement of the soft tissues, and promotes a pumping action which will prevent the blood from becoming stagnant beneath the saddle; (*g*) in adapting the saddle to the abutment teeth the gold is cut away so that it does not impinge upon the soft tissues in the gingival region.

The attachments which Dr. Chayes has developed are mechanically perfect, and by the use of the parallelometer and the parallelodrill removable bridge work may be accurately placed in the mouth without causing undue strain upon the teeth to which they are attached. This fact is of the utmost importance in point of service of this class of substitutes.

OPERATIVE DENTISTRY.

(1) *Amalgam filling.* The manipulation of this material has undergone some radical changes. It has been proved beyond a doubt that most excellent and serviceable restorations of crowns of teeth may be made in amalgam and by the Crandall method. The features of this system are (*a*) cavity preparation, (*b*) formation of the matrix, (*c*) instruments designed for condensation, and (*d*) the application of force. The anchorage for the retention of the filling is obtained in the pulp chamber, the filling being firmly seated against the subpulpal wall, and further strengthened by the surrounding vertical walls of this portion of the tooth.

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The matrix is made out of thin copper plate, and after being cut to conform to the line of the septal tissues and to the size of the crown, holes are punched at the points of contact on the approximal portions and enlarged sufficiently so that the amalgam when introduced into the matrix will be forced against the surfaces of the approximating teeth; and will remain in direct contact with the tooth structure. The band is also slit from its gingival border to these holes on the approximal surface, so that in removing the matrix band the amalgam is not disturbed at the contact point. These matrices are tied about the tooth with the ligature. The instruments are designed to enable the operator to condense a much greater area of amalgam at a time, and in many instances cover the whole occlusal surface. The application of force is by means of the hand mallet, which drives the particles of the amalgam very closely together, producing greater density and thereby rendering the material capable of standing the stress of mastication.

(2) *Radiography.* This apparatus is proving its worth as a means of diagnosing dental lesions. However, if we are to obtain its greatest efficiency in recording the accuracy of the fillings in root-canals, for instance, it is obvious to all who have made even a superficial study of these cases that a change should be made in our present materials and methods of technique; that is, (*a*) better access should be gained to root-canals, enabling a more thorough reaming, and (*b*) a filling material of higher refractive index.

(*a*) There is not sufficient stress laid upon the mechanical cleansing of root-canals. This statement should be followed by a distinction being made between tortuous and straight ones. In the former it is useless to argue that these canals must be made accessible to their very apices. While all available means should be employed to thoroughly ream such canals, it is impossible to always accomplish even fair results, and in cases of failure, other methods should be adopted to maintain asepsis. In a paper recently presented by Dr. C. N. Johnson he said that, under such unfavorable conditions as classed under the latter division, tortuous buccal and mesial canals of upper and lower molars could be best treated by filling them with a paste made of oxid of zinc and formocresol, this material to be carefully introduced as far as possible into the canals. He felt that this method was preferable to that of a partial filling with other materials, on account of the powerful antiseptic qualities of the formocresol. I hesitate to quote Dr. Johnson in this, for fear that someone will not put the correct interpretation upon what he means by tortuous and partly inaccessible root-canals. All normal canals should be thoroughly reamed not only to remove by mechanical means the infected dentin, but to so enlarge them that their apices may be stopped with greater accuracy.

(*b*) The employment of euca-percha compound in the filling of root-canals—as a lubricant or a sealing, does not meet the requirement from every viewpoint. The most serious objection to its use is its low refractive index to the X-ray. In many buccal and mesial roots of upper and lower teeth and the bifurcated roots of bicuspids, we have to rely solely upon euca-percha compound, because of one's inability to place a gutta-percha cone at their apices. Many radiographs show absolutely nothing in

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these canals beyond the gutta-percha cone, when from an operative sense the apices have been perfectly sealed with euca-percha compound; therefore, some ingredient should be added to euca-percha to increase its refraction. It must be quite apparent to us all that the radiograph is showing many foci of infection which we thought were properly cared for by our treatment and filling of root-canals.

PYORRHEA ALVEOLARIS.

There has been much investigation during the past year in regard to the cause of this disease. In reviewing the literature which has appeared in the medical and dental journals, it is stated that more than half of all the teeth which are lost are the direct result of the ravages of pyorrhea. Bass and Johns claim that the endamœbæ, chiefly of the species E. buccalis, are found in all pyorrhea lesions, and are absent under normal conditions; again, that the endamœbæ develop and live in the dying tissues at the very bottom of the pocket. Therefore material for examination is best obtained with a No. 22 Younger scaler or a spoon excavator from scrapings at the very base of the lesion.

The treatment which is recommended is ipecac and its alkaloids, emetin and cephalin. In experiments with emetin by Bass and Johns, it was administered by hypodermic injections and later by mouth with a view of having a sufficient amount concentrated in the body to kill the endamœbæ within the pyorrhea pockets. Smith and Barrett have employed the same endamœbicide locally and by injection into the lesion, while others have given the Alcresta ipecac two or three times a day in ten-grain tablets. The question, however, is raised that there are so many slight abrasions of the gingivæ and numerous inaccessible pockets about the teeth that a local treatment would not be as efficient as the systemic. The dose of emetin for an adult is one-half grain daily by hypodermic injection, all cases subjected to at least three days' treatment and none having more than six days, the time being governed by the stage of the disease. Bass and Johns claim that in ninety per cent. of cases the endamœbæ cannot be found after three days' treatment, and that in ninety-nine per cent. they disappear in six days' treatment. Coincidently with removal of the endamœbæ the gums stop bleeding and they begin to heal to some extent. To prevent possible reinfection the mouth should be kept as clean as possible. One or two drops of fluid extract of ipecac diluted in half a glass of water has been recommended as a mouth-wash. If the endamœbæ re-occur in the mouth after four or six weeks, the treatment must be repeated.

UNIVERSITY OF BUFFALO DENTAL DEPARTMENT REPORT.

In order to determine the status of the treatment of pyorrhea based upon the experiments of Bass and Johns and Barrett, investigations have been carried out in the research laboratory of the University of Buffalo Dental Department. The idea of the investigation is to carry out various combinations of treatment, both local and constitutional, to determine which gives the better results. This will necessarily take considerable time, and at the present it is impossible to make any very definite statements.

In the twelve cases examined by Dr.

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W. H. Lane, the endamœba buccalis has been found. Cases treated with Alcresta ipecac have shown without very careful local treatment a marked improvement in objective and subjective symptoms, but in no cases after one or two series of treatments, that is, six successive days, have the endamœbæ been eliminated. In other cases treated with Alcresta, with careful local treatment, the results have been a more marked improvement in the local conditions. In other cases treated by instrumentation alone, the improvements have apparently been just as great. Cases treated with emetin hydrochlorid have shown a more rapid improvement, but even in these, contrary to the findings of Bass and Johns, it has been possible to demonstrate the presence of endamœbæ after six days' treatment.

A noticeable fact in connection with the administration of ipecac by mouth is the improvement of stomach conditions. In a number of cases, the patients, as might be expected, have been sufferers from stomach trouble, and these have shown marked improvement.

While it is impossible at this stage of the investigations to make any very definite statements, it seems that the treatment with the emetin hypodermatically gives better results than ipecac by mouth; also that careful local treatment without ipecac or emetin in any form gives equal results. Though it does not seem probable that the endamœba buccalis is the cause of pyorrhea, that its actions may prepare the way for the ravages of pus-producing bacteria seems quite probable. It is not a pathogenic organism in this location. The fact that the disease readily recurs if proper prophylactic measures are not carried out demands that the dentist shall not give up his old ideas of treatment for a method which falls far short of the ideal.

GRATWICK LABORATORY REPORT.

In this laboratory, Dr. Moss has treated about fifty cases of pyorrhea alveolaris by subcutaneous injections of emetin hydrochlorid, and in re-examination of a majority of them has only found two cases of a recurrence of endamœba and these might have come from reinfection. He also states that it does not seem likely that the removal of endamœbæ alone will cure the disease, but that the most rigid surgical and prophylactic treatment must be the follow-up work of the dentist. Neither does Dr. Moss believe that the endamœba buccalis is a pus-producing organism, but that it may pave the way for such bacteria later on. He has not had sufficient time, however, in which to prove these statements.

While there is much dispute in regard to the cause and treatment of pyorrhea alveolaris, there are some statements regarding the inception of this disease which every general practitioner should have firmly fixed in mind. It is stated that over ninety-five per cent. of the adults examined by Bass and Johns had pyorrhea. It has also been shown that ninety per cent. of the cases of this disease are directly caused by faulty operations upon the teeth or injury to the septal tissues at the time. These include (*a*) poor approximal contact, which is divided into lack of contact, improperly placed contact points and too much contact; (*b*) leaving large masses of filling materials beneath the gingiva in the interproximal spaces; (*c*) injury to the septal tissues in the use of clamps, separators, and matrices.

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also in the application of ligatures in adjusting the rubber dam and in the use of strips and disks in the finishing of fillings. The restoration of occlusal surfaces is just as important, the tooth being as dependent upon its intercuspal relations as it is upon its approximal contact, to remain in proper alinement. This fact brings to mind the prominence which malocclusion of the teeth assumes in association with this disease; it should be considered as an etiological factor. (*d*) Bass and Johns as well as other investigators claim that the endamœbæ do not attack normal tissue, that it must be damaged in order for them to find lodgment and to develop.

In view of the foregoing statements, it is obvious that the future generations cannot escape from the destructive influences of pyorrhea through the administration of drugs, but that they may be saved from the inception of this disease in very many cases by a more intelligent and careful technique by the general practitioner.

ORAL SURGERY.

While there is nothing distinctly new in this field of dentistry, there is no lack of interest in the ultimate results of the latest treatment of the diseases of the oral cavity.

This subject opens up an enormous field, of which the general practitioner must have a fair knowledge. That is, he must be sufficiently familiar with the etiology of pre-cancerous conditions, with the lesions of syphilis, and with tuberculosis, to refer them to the proper channels for treatment. Many times the source of cancer in the mouth has been traced to broken teeth, ill-fitting dentures, roughened edges of bridge work and the bands of crowns which are deeply embedded in the gingival tissues. These are conditions which occur in everyday practice, and we are not doing our full duty toward mankind if we neglect these rare opportunities of service.

CONDUCTIVE ANESTHESIA.

While this is among the later methods of employing local anesthesia, it should not be commonly used for all minor cases. It requires very delicate technique, because the injection is made directly within or at the orifice of the bony canals which contain the nerve trunks. This procedure also calls for an intimate knowledge of the anatomic landmarks about the foramina, as well as of the position of the structures which lie in the immediate vicinity. Caution is again made against any lack of strictest asepsis in the preparation of the solution, and in the maintenance of suitable instruments for this class of work. The technique of making these injections is to be found in our latest text-books upon anesthesia.

TOOTH EXTRACTION.

Extraction is becoming more of a science, and a definite technique is being worked out. The importance of asepsis is better understood, and the necessity of post-extractive treatment of the tooth socket is nowadays considered a necessity. The value of the microscope and bacteriologic technique in the diagnosis of oral lesions is being recognized to a considerable extent, so that altogether the dentist is no longer a man of haphazard chance.

ORAL HYGIENE.

The oral cavity is of so great importance to bodily health that it is fast

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coming into prominence as a new field of investigation. It has been ignored by the medical as well as the dental profession altogether too long. If any other part of the human body indicated the amount of infection which the mouth shows, for instance, upon examination of the tongue, the medical man would say that such a focus of infection was a menace to the general health, and should have immediate attention. Since rheumatism, arthritis, kidney disorders, and endocarditis have been traced directly to infection about the teeth, the physicians and dentists have begun to realize the gravity of the situation.

DISCUSSION.

Dr. S. E. DAVENPORT, New York. Much interest has been aroused in my mind by an examination of the "Reports on Practice" for the last eight years by the various committees in charge of that important department of the work of the Dental Society of the State of New York.

During those years the committees have been headed by Drs. Wm. B. Dunning, Arthur H. Merritt, F. P. Hamlet, W. D. Tracy, and for the last two years, Daniel H. Squire. The excellence of these reports is explained and accounted for when the above list of chairmen—than whom this society possesses no more earnest students and no better clinical practitioners—is noted.

My opinion is that these Reports on Practice, as complete and dependable as they are—being the result of much thought and generous reading on the part of the various committees having them in charge—do not receive the attention they deserve by simply being read and discussed here, and then printed in our proceedings. There is not in existence a history of the progress of dentistry for these recent years equal to these combined reports, and no better use of society money—if we had any—could be made than to publish them collectively in a pamphlet for distribution among the younger members of the profession, particularly to those just graduating from dental colleges.

Dentistry really seems to be coming into its own; to be gradually receiving the recognition it deserves. Oral hygiene, prophylaxis, and other preventive measures are everywhere making way, and their value is becoming established in the minds of the people. Public clinics are everywhere, dental examiners for school children are quite common, no hospital of any size is complete without its dental intern and corps of part-time workers, volunteer or paid, and many of the large corporations and great department stores, where men and women are employed, have dentists who are paid to serve the employees, usually without fee.

For years dentists have grieved over the fact that physicians either failed or declined to recognize them as professional brothers—many papers and discussions having been devoted to plans and suggestions for bringing about a closer professional intimacy between

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physicians and dentists, who really had, or to the dentists seemed to have, so much in common. Now all is changed, for since Dr. Hartzell and others have so conclusively demonstrated the connection between the mouth-grown pathogenic germs and the various forms of arthritis, through secondary infection, the physician and the dentist are working together, as they ought to have been working before, and the physician is really beginning to learn something about the teeth as well as about the possibilities of dental service as a corrective for systemic ills.

Appreciating the danger to the whole system of allowing diseased teeth to remain in the mouth, I fear a too radical turning toward extraction as a remedy rather than the application of such methods of healing as we possess for the retention of teeth which can be made healthy and useful. The average physician places small value upon a tooth, and in collaboration with him we need to stand firmly for the preservation of such teeth as in our opinion would, after treatment, be a help and not a menace.

The justly prominent American dentist of London, Eng., who fell dead from rupture of the aorta in March last, was fulfilling his duty to mankind and to his profession up to the moment of his death, for he was at the telephone talking with a physician about a patient they were both serving, and his last words were, "I shall insist that those teeth be preserved."

Any report of the progress in dental practice for the past twelve months would be incomplete if it did not include some reference to the prominent part which dental surgery has been playing in the military hospitals of Europe. Never before have dentists contributed so largely to the relief of the wounded, and I believe this to be the first war in which dental surgeons in any hospital have taken complete charge of practically all wounds in and about the buccal cavity. This situation has been, perhaps, best illustrated in the American Ambulance at Neuilly, Paris, where Drs. Geo. B. Hayes and Wm. S. Davenport, dental and oral surgeons to the hospital, assisted by Dr. Wm. H. Potter of Boston and others, have accepted the responsibility of caring for all wounds of that character.

Dr. C. Winchester Dubouchet, formerly of Baltimore, who is in official charge of the American Ambulance, his associate, Dr. Joseph A. Blake, formerly of the Presbyterian Hospital, New York City, and the other general surgeons, unite in according the highest praise to the dentists on the hospital staff for their efficient and successful work, it having been not merely auxiliary service but a masterly acceptance of responsibility for the full care of a class of wounds, including fractures of the jaw, which have been so difficult usually for the general surgeon. The great amount of fighting from trenches has resulted in a considerable proportion of wounds of the mouth, teeth, and jaws, which dental and oral surgeons are trained to treat. While official records of the results of dental service at the American Ambulance are available, lack of time causes me to refrain from quoting from them in this discussion, and I will only add that in relief work near the firing-line, as in private practice in our offices, the practice of dentistry has made distinguished progress during the past year, and that we may truly say that hereafter no well-equipped military hospital will exist without its department of dentistry.

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All honor to these distinguished American dentists, whom I have mentioned by name—all members of the First District Dental Society, by the way—who have for months neglected their private patients for the purpose of rendering voluntary service of so high a character to those poor suffering wounded men of all nations.

Dr. G. H. SHANNON, Cambridge. We have all listened with a great deal of benefit and pleasure to the report of the chairman of the Committee on Practice, and have heard a clear, concise, and conservative *résumé* of the more prominent matters of interest in the year's work of the profession. The report devoted a few well-deserved lines to Spence's plaster, which seems to deserve more consideration from the profession than it has had, and should be thoroughly tried out by everyone.

Having used this plaster ever since it was first brought out by Dr. Spence, I consider it indispensable, though on first acquaintance it is an obstinate material to work, and one is inclined to discard it as impossible. But when its use is mastered, a model can be prepared from it in forty minutes or less which will be entirely safe to build trial bite plates upon, and if it is allowed to harden thoroughly, the final swaging of a gold plate, using only the press, and not the hammer, is entirely practical. The directions for its use, of course, should be carefully followed.

With reference to controlling the shrinkage of rubber during vulcanization, we should not forget to mention Greene's metal forms in forming our model. When a metal form, bent to conform to the teeth when waxed up, is placed over the teeth while pouring the female part of the flask, the crowns of the teeth come in contact with the metal form and are held more firmly in place; distortion during vulcanization is more thoroughly controlled, and the articulation is more securely maintained.

Amalgam as a filling material, its application and technique as cited, deserve thorough mastery and trial; it will undoubtedly render unnecessary and criminal the placing of a large per cent. of gold crowns, with the inherent horrible mutilation of the teeth and gingival margins, the ultimate result of which is pyorrhea and total loss of the abutment tooth.

Of the great value of radiography both to the practitioner and patient there can be no longer any doubt. But until the medical and dental professions together recognize more fully the menace to general health from unclean mouths, carious teeth, and the innumerable pathogenic micro-organisms harbored therein, which work havoc with the more remote parts of the body, and realize that something less contemptuous than "only a tooth" is involved; and until, perhaps, in the next two hundred years, the code of ethics will be so understood and interpreted by the organized profession as to allow the man in the street to be reliably informed in these matters, the ordinary practitioner in the small city or village will have no call for radiography, because, not knowing its value, the patient will not pay for it, and the dentist, of course, cannot maintain the service.

With reference to emetin hydrochlorid, Barrett and Bass and Johns have not, as far as I understand, made a distinct claim that it will by itself cure pyorrhea, but only that it is a perfect

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amœbicide, and so far as the endamœba buccalis is responsible for any phase of pyorrhea, that drug is a specific.

A very distinct line should be drawn between the claims of these investigators and the claims made by the manufacturing chemists.

If, as many are claiming, emetin cured pyorrhea, it would become utterly unnecessary, so far as pyorrhea is concerned, to remove the mucous plaques and fungoid growths from the gingival margins and interproximal spaces by prophylactic treatment; and we would have to admit—which I am utterly unprepared to do—that abraded gingival surfaces, irritating rough, sharp edges of tartar on the teeth or root surfaces, or the wounding or obliteration of the papillæ by malposed teeth do not furnish opportunity for infection and reinfection by the various well-known pathogenic organisms inhabiting the oral cavity, and that reinfection from this source is a negligible factor in the treatment of pyorrhea.

If I am correctly informed, the usual laboratory tests have not been made to prove that the endamœba buccalis is the specific cause of pyorrhea—*i.e.* that from a typical case of pyorrhea the endamœba buccalis has been isolated, a pure culture made, and from that culture, in a perfectly healthy tissue, pyorrhea has been produced by inoculation; —and until that has been done, had we not better go slowly?

This treatment has been most enthusiastically and I believe ill-advisedly heralded throughout the medical, dental, and lay press as specific. An article has appeared in the Sunday issue of a great metropolitan daily, over the signature of an M.D., written in a very light vein, the people being practically told to purchase a hypodermic syringe, inject themselves once a day for three or four days with emetin hydrochlorid, and be cured! Is it not high time for the profession to insist publicly that it be taken more seriously, and that we refuse to be rushed into a position that may be found untenable?

The chapter on pyorrhea in this report can mean only one thing, namely, that our operative technique be so changed that it will exclude the rubber dam and its ligatures, the gold crown that is jammed up beneath the gum to hide the "fit," the amalgam fillings which encroach upon the interproximal space, and all operations in a field not rendered aseptic.

There is hardly a limit to which we may go in the discussion of the individual items of this paper, but there is one phase upon which I would insist. Someone has said that "the effective way to think is in terms of the whole," and as we look at this paper as a whole, and realize that it is almost altogether confined to scientific items having for their basis the microscope and the test tube, and compare it with a report on the same subject of thirty years ago, which was devoted almost wholly to mechanics, we have the measure of the distance which the profession has advanced. We must, however, not forget that the very *raison d'être* of the profession is its gain in knowledge and ability which shall be not only appropriated by us as individuals but shall be applied for the benefit of humanity, and when it is remembered that only a small percentage of humanity is actually benefited by our efforts, we should be startled by the large number of the unattended, which is the measure of our failure as a profession. For a man or

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a machine that leaves fifty per cent. of work undone is classed as inefficient, and our first duty seems to be to render our profession effective. The power to gather and classify so much information for our use as individual practitioners implies an ability for completion of the work for the full benefit of humanity.

In closing, let me read what, to my mind, is the gem of the report—*i.e.* "The value of the microscope and bacteriologic technique in the diagnosis of oral lesions is being recognized to a considerable extent, so that altogether the dentist is no longer a man of haphazard chance." The smooth silkiness of this phrase should not blind us to the subtle warning it contains, and woe unto us if we do not heed it; for men like Hunter, Osler, and Mayo are using the lens, and have shown and should show us no mercy.

Dr. C. H. THOMPSON, Goshen. There are one or two points in the paper which appeal to me particularly, and one of these was the use of emetin. We may or may not be getting at the basis of pyorrhea, but these investigations and efforts, whether they prove the value of this particular agent or not, are worthy of our consideration, and the men who are following out in their research work these methods in an attempt to discover the true basis of pyorrhea deserve not only our hearty support, but also great credit and consideration for the work which they are doing. In my practice I have been using emetin for several months, not only following Bass and Johns', but also Smith and Barrett's methods. In comparing cases of similar conditions of gum recession, I have found that the method used by Bass and Johns, viz, the intramuscular method of injection, gives more beneficial results. I have never attempted the treatment of cases of pyorrhea without spending hours in instrumentation before applying emetin, and I attribute a vast amount of the beneficial results obtained purely to the instrumentation. The intramuscular method of injection in my experience has produced more marked and quicker results than the placing of emetin directly in the pockets, apparently owing to the fact that we do not know when we get all pockets properly flushed. The latter method, therefore, has proved in most cases to be a failure in my hands. One of the most beneficial and quickest results from the use of emetin is the stopping of the bleeding of the gums.

One of my patients has been suffering for some time from a derangement of the stomach, and was undergoing treatment for pyorrhea, and after the second injection of emetin his stomach trouble ceased. This may be a coincidence, but it struck me as being a very peculiar one. I would like to have the essayist answer this question: In some cases treated by emetin I have observed swelling of the submaxillary glands, and I would like to know the significance of that observation.

Dr. J. O. MCCALL, Buffalo. My specialty makes me more interested in that part of the report which deals with emetin than with the other portions, and I wish to call attention, perhaps in a little different way from the essayist, to some pertinent items. For a good many years we have all realized that the pus in pyorrhea cases was produced by the presence of micro-organisms, and the natural treatment consisted in injecting some agent into the pockets which would destroy the micro-organisms. This treatment, however, has not yielded the desired

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results, at least without mechanical treatment, such as scaling and polishing of the roots and relief of malocclusion, etc. This observation points to the fact that emetin may be of great value, but we cannot hope to obtain results from that drug alone. We must realize that in the treatment of this disease there is always a tendency on the part of the dentist to get away from the laborious mechanical treatment, from the acquiring of the technique which is necessary to secure perfect mechanical results, and I feel that the dental profession is going to suffer a great disappointment from emetin or ipecac treatment on this very account. On the other hand, I know that very good results can be obtained without it, and yet I am not ready to say that it is not of value. But I do not think that we should put too much reliance in this drug, until we have had the chance to investigate it more thoroughly and in a truly scientific manner. We must remember that the invasion of the tissues by micro-organisms has been claimed by all investigators to depend upon a primary mechanical injury to the soft tissues. Pyorrhea alveolaris is really a protean disease, not due to any one but to several causes, and we must strive to take care of these causes, whatever they may be, in the order of their importance. I believe that there is some value in the emetin treatment, because there is no question that in a great majority of cases there is considerable improvement when emetin is used, even without any mechanical treatment, but I cannot get away from the feeling that the treatment should consist in the removal of mechanical irritants, as well as treatment by drugs.

Dr. F. W. Low, Buffalo. Before making any remarks on any therapeutic agent, it has been my habit for a number of years to try it on myself. I have submitted to five hypodermic injections of emetin, not because I suffered greatly from pyorrhea, but because I felt it my duty to my patients to know how much inconvenience they might suffer from the administration of emetin.

Through a combination of circumstances my teeth had not been prophylactically treated as formerly, and it was over three months since the last treatment, when my mouth was examined to determine the presence of amœbæ. Dr. Moss, in the presence of several of my friends, found amœbæ present around the necks of my teeth, and demonstrated them under the microscope. There is no question about the amœbæ being alive. Dr. Moss tells me that the protozoa not only are alive, but that in pyorrheal teeth he finds pus cells in the peridental membrane, and below that tissue amœbæ, which he has also found in the bowels. Three weeks after I had taken the injections, I had a re-examination made, and there were no amœbæ present. At the recent state medical society meeting in Buffalo, Dr. Stewart of Philadelphia, an eminent medical man, read a paper on this subject, and I asked him, in closing the discussion of his paper, to tell me how long I might hope to remain immune, and he replied, probably three weeks. Of course, I do not intend to submit to hypodermic injections every three weeks. I have used as many as sixty of the half-grain tablets, and I believe I have materially relieved conditions, that is, the symptoms of discomfort did not recur, whereas these had usually recurred two weeks after I had finished prophylactic treatment. One patient has had thirteen injections of the bromid of emetin in the muscles of the

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abdomen. When he called for prophylactic treatment, instead of giving him the regular prophylactic treatment, I prescribed injections of emetin, and when the patient returned at the next appointed time for prophylactic treatment, I noted a very marked improvement and a more healthy condition of the tissues.

Dr. SQUIRE (closing the discussion). Concerning the conclusions drawn in the report with regard to improved technique of the general practitioner, it surely occurs to every man in general practice that he has to improve his technique. Perhaps the greatest criticism of the specialist in pyorrhea is that we are not careful, that we do not take care of our gingival margins as well as we should, that we produce unnecessary laceration of the soft tissues. Dr. Black has proved, after careful tabulation of the effect of working on the soft tissues, that we produce a great deal of mutilation, and he has shown in his report that ninety per cent. of the pyorrhea cases observed were produced by the general practitioner's poor technique. I drew this conclusion because I could not draw any other, and because I am not an investigator I had to be governed by the work of the men who have made researches in this field.

In regard to infection of the submaxillary gland, I can only repeat what others have told me in regard to infections of other glands after the injection of emetin; that is, that it must be due to some fault in our technique of administration.

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Concerning the Production of Dental Caries.

By ARTHUR HOPEWELL-SMITH, L.D.S., L.R.C.P., M.R.C.S., Philadelphia, Pa.,
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OF all the subjects which constitute that branch of the healing art which is generally designated by the title of dental surgery, none has occupied the attention, time, and investigations of men more than that of dental caries. The reason is obvious. Daily confronted with the ravages of this common dental affection, they naturally endeavored, from the days of Leewenhoeck, to ascertain as much of the abnormal changes going on in the oral cavity as they possibly could.

Yet, in spite of all the writings of some of the ablest men of the dental profession, our knowledge is today still very incomplete. Historically the question is of great interest—not so much from the mistakes made, the false doctrines promulgated, the erroneous hypotheses suggested, the ludicrous statements formulated, as from the amount of truth discovered in the struggle for the clarification of the dim uncertainties of the problem.

Fortunately the treatment—mechanical and still largely empirical—was a simple problem, and soon solved, with regard to its general principles; but from the viewpoint of its causation, who can deliver an *ex cathedra* announcement which will be accepted as a certain verity by all classes of the medical and dental communities of the world? The fact is, as I have frequently insisted elsewhere, we do not know.

Why is this? It would seem that although a great deal of knowledge is forthcoming, although much digging in the ground for the nuggets of truth has been accomplished in the clinic, the laboratory, and the study, many diversities of conflicting thought exist, and it is as yet impossible to answer the question as to the nature of the etiology of the condition.

One need not again remind one's hearers that dental caries is not a disease, but a morbid condition; not a disease, because no one has succeeded in producing the signs and altered states of the tissues, either in the mouth of man or of the lower animals. Attempts in this direction have failed. Experimentally it is apparently perfectly easy to induce *in vitro,* by laboratory means, practically the whole of the morbid appearances connected with it. But the phenomena associated with it are totally dissimilar from those of caries of bone, and prop-

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erly speaking are of such a nature as to preclude the possibility of ever placing it side by side with, and in the published category or classification of, any known disease.

Nevertheless, the word "caries" does occur in official documents. For instance, in "The Nomenclature of Diseases," drawn up by a Joint Committee appointed by the Royal College of Physicians of London, and issued as a fourth edition in 1906, one finds the word appearing under the heading of *Apparatus peptici morbi,* and in the subdivision entitled *Dentinae, cementi, et adamantis morbi.* But it should not really occupy that place; and its juxtaposition to a changed condition of the cementum which is called "necrosis (of cement)" reveals that the authors of that official volume are still at a loss as to its significance. Even if one considers its meaning both literally and specifically, it at least should be bracketed, and a footnote explanatory of the affection appended. Its inclusion in that list is as incorrect as the suggestion that a tissue like cementum could ever possibly become necrosed.

My personal views have been frequently published, and are well known in certain sections of the dental world; but with the larger sphere of dissemination which this present meeting affords, the problem may well and profitably be reconsidered and re-discussed.

I do not propose to offer today a hypercriticism on various theories; I desire to narrate shortly what seems to me to be the only possible position to assume in regard to this matter, and to detail some steps to achieve the same.

In the past the subject has been dealt with chiefly by the bacteriologists, of whom Miller was the bright particular star. The clinician, the chemist, the physiologist have also been pressed into service, and have each *in suo modo* added to our knowledge. It is important, however, that the anatomist too be consulted.

ENVIRONMENT.

Dental caries must of necessity have its origin in the environment of the teeth. Strictly speaking, the meaning of the word "environment" includes a study of the nature and functions of the oral secretions and of the oral flora. But more than that: it includes a thorough understanding of the rapidly repeated variations these normally undergo in the presence of foods, be they solid or liquid, cooked or raw, and in the presence of other vicarious extraneous substances, be they medicinal or mechanical, persistent or transitory, innocuous or harmful. And further, and perhaps more important still, it includes the very complex investigations of the variations set up in these functions and in these actions as a part of general metabolic disturbances and diseases.

SUGGESTED CAUSES.

It is quite easy to mention the supposed, text-book causes of caries. The causes to which it is attributed may be conveniently classified in two great groups:

(A) *General predisposing causes:* 1 Civilization. 2. Heredity. 3. Improper dietary.

(B) *Local predisposing causes:* 1. Defects in tooth structure. 2. Irregularities in position of the teeth. 3. Vitiated oral secretions, the direct result of —(i) Occupation. (ii) Systemic diseases such as gout, rheumatism. (iii) Pregnancy.

The exciting causes are described as

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being a carbohydrate fermentation in so-called "stagnation areas," due to the lodgment of soft, starchy, sticky, and sugary foods, which become changed to a weak acid.

In other words it is believed that the bacteria of the mouth, accumulating on the surface of the teeth, reduce carbohydrate foods to sugar, and change it to lactic acid; as a corollary to this it is further assumed that in the treatment of the affection it is necessary to destroy these micro-organisms or to inhibit their action by suitable means.

SOME CRITICISMS.

It would be no difficult task to criticize adversely all the arguments advanced by those who hold these cast-iron opinions. For instance, with regard to heredity alone, one may safely say that it has very little, if any, influence in the production of dental caries. One can apply to this general belief in the transmission of physical and psychical parental attributes numerous examples of the influence of environment as apart from heredity. A musical child of musical parents is considered by many to have inherited a musical instinct—call it what you will. But all children of musical parentage are not themselves musical. It is the artistic environment which surrounds receptive conditions from early childhood. The same argument also can be applied to the so-called inherited mathematical instinct. It is the result of environment—and so is dental caries. Parents possessing normal dentitions beget children with dentitions free from defects, and see to it that their dental environment is similar to their own. One child in the family of such parents may have rampant acute caries. This is probably due to the fact that a change has been induced by illness or debility of the patient or lack of hygienic habits in the environment of the teeth, objected to and discouraged by parental solicitude without avail. Those cases scattered through the pages of dental literature of clear, successive, anatomical deviations from the normal may be classified as "sports," and are not really examples of heredity.

The influence of civilization has often been advanced as a cause of dental caries. It is extremely probable that this opinion will have to be modified. Pickerill, in "The Prevention of Dental Caries and Oral Sepsis," notes that among the relatively immune races of mankind the Kaffirs possess 14.2 per cent., the Bushmen 20.6 per cent., the Australian aborigines 20.5 per cent., and the Tasmanian aborigines as much as 27.0 per cent. of caries. Surely these people can be considered as hardly coming under the control of what is generally meant by civilization.

FACTS.

Two things are absolutely certain. Dental caries is characterized by a partial destruction of Nasmyth's membrane and by a breach of surface of the enamel, with subsequent loss of the latter tissue; and secondly, it is a condition most commonly confined to childhood and adolescence.

SUGGESTED LINES OF THOUGHT.

The lines upon which the investigator of the problem must work are these: He must in his laboratory methods approach closely to the natural conditions which obtain in the mouths of ordinary individuals.

In deciding the invisible operations of saliva on the causation of caries, he

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must estimate more than its mere digestive action—the conversion of starch into maltose and dextrin through the erythro- and achroo-dextrins. He must ascertain the variations it undergoes as a result of disease or certain physiological disturbances. He must include in his researches the inhibiting action of certain substances, the varying dilutions through which it daily passes during the eating of manifold varieties of dietetic articles. Similarly the bacteriologist must determine by actual experiment the new conditions which arise, for identical reasons. Both the physiologist, the chemist, and the bacteriologist must also not fail to remember the nature, condition, and functions of enamel and its protective covering, Nasmyth's membrane.

The arguments of these various seekers after truth must be co-related, and, leavened with common sense and experience, applied to the study of the causation of this affection, and our knowledge will then, and not till then, be greatly benefited thereby.

ORIGINAL OBSERVATIONS.

Actuated by these thoughts, I have during the past few years devoted considerable attention to this aspect of the question, and I would urge my hearers when thinking over the matter to adopt the same viewpoint. Apology is not needed to re-state before a large audience such as this some of the conclusions to which I have come—conclusions which I trust time will prove to be correct.

Leaving aside the purely hypothetical arguments, a summary of my observations shows several interesting and I think important deductions. In the first place, when dealing with the behavior of caries-producing bacteria in the presence of certain common dietetic substances, it has been ascertained that pepper, fruit juices, starch, and candies—except those containing a proportion of flavoring element such as vegetable or inorganic acid, and especially those of a sticky character—are bacteriophile, while mustard, vinegar, coffee, acidulated candies, glucose, and perhaps cane sugar, are bacteriophobe.

Secondly, it is equally clear and probably correct that the enamel cuticle when intact is a potent factor in the prevention of the attacks of dental caries, and also that penetration of bacteria masses beneath its abraded edges determine the *loci principii* of the affection.

Thirdly, it is highly important to note that the use of candies in the mouth may lead to dental destruction by mechanical, chemical, and bacteriological means. Of the former, many hard species of candies actually crack and break off enamel and dentin, on account of their intense hardness. "Sugar almonds" and "hardbake" are of this type. But far more harm is wrought by chemical and bacteriological means—one, perhaps, by perverting the nature of the oral secretions, and the other by encouraging the growth and development of caries-producing bacteria within the confines of the oral cavity.

It is necessary to determine whether and in what ways the oral secretions are altered in their nature, chemical reactions, and amounts by the use of candies, to compute the reactionary variations between the salivas of immunized and non-immunized persons, and to determine whether typical candies placed on interstitial surfaces in artificially prepared cavities, and on the free surface of human teeth, produce caries of the enamel or dentin.

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It was first extremely important to ascertain whether saliva is rendered more acid by the presence of sugar in the mouth, or not—that is, assuming that an acid reaction of the saliva is harmful for the enamel.

For this purpose the disaccharids and the monosaccharids were tested under similar conditions, both in salivas from a mouth apparently free from active caries and from one in which caries was actively going on. The experiments, carried out *in vitro*, will be detailed fairly fully in order to allow them to be repeated by others, and to satisfy or otherwise the critics and chemical, physiological, and bacteriological experts.

METHODS.

The methods adopted were chiefly devoted to computing the extent of acidity or alkalinity of mixed saliva in mouths in which caries was absent, and also in those in which it was present. These are designated types I and II, the former being collected in known quantities from the mouth of an adult male of forty-three years, after thorough oral ablutions with warm water, and the latter from the mouth of a female of twenty who was not immune to dental caries.

It was found that both types varied in their chemical reactions; before noon perhaps acid, afterward alkaline, as the case might be. Thus on July 1st, at 10 A.M., 2.5 cc. type I saliva showed 1.6 cc. of acidity, and at 2.30 P.M. on the same day 2.5 cc. of fresh saliva of type I became chemically changed, and showed 1.4 cc. of alkalinity. Cases frequently exist where the saliva is synchronously acid on one side of the mouth and alkaline on the other. This would seem to be dependent upon the ebb and flow of the acid or alkaline "tide," the cause of which, however, at the present time is not satisfactorily determined. The salivas were collected in closed beakers and treated at once. Alkaline saliva will, if left in a jar exposed to the air, become foul-smelling; acid saliva appears to become altered in a different way.

The operation for acidimetry. Into a graduated vessel was poured 2.5 cc. of saliva, this amount being invariably used as convenient, on account of the fact that it can be collected successfully every ten minutes.

In performing a titration N/40 NaOH was used, with freshly prepared phenol-phthalein as the indicator, the proportions being—

Sodium hydroxid, 1.0 gm.
Phenol-phthalein, 0.25 "
Distilled water, 1000 cc. (1 liter).

Under a Mohr's buret containing this rosy-red solution was placed a small white dish which had previously received 2.5 cc. of the saliva to be tested. The solution was allowed to run into the dish drop by drop (each drop representing about 0.1 cc.), and thoroughly stirred with a glass rod. The end point of the reaction was reached when all the coloration had been discharged.

The test for alkalinity was performed by means of a modification of the Lowry-Zuntz method as employed for blood alkalinity, and consisted in using N/75 tartaric acid—that is, 1 gram of tartaric acid in 1 liter of distilled water. The alkaline saliva (2.5 cc.) having been placed in a receiver, the tartaric acid solution at 15° C. was added drop by drop, until a drop allowed to fall on neutral litmus paper from the end of a glass rod or stirrer had lost its blue color and had become decolorized. It

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was quite unimportant to ascertain the acid or alkali content by any quantitative reckonings.

List of Experiments.

SERIES A (CHART II).

Alkaline saliva, type I; *saccharose.*

The details of the simplest of all experiments can be recorded as follows:

2.5 cc. at a certain hour required 2.5 cc. of N/75 $(CHOHCOOH)_2$ to neutralize it; 7 gm. of cane sugar (table "loaf" sugar) were dissolved in the mouth, and 14 cc. saliva collected immediately. The saliva became slightly more alkaline, as it then required 3.0 cc. tartaric acid solution to neutralize it. It remained thus for ten minutes, when it required 2 cc.

SERIES B (CHART I).

Alkaline saliva, type I; *glucose.*

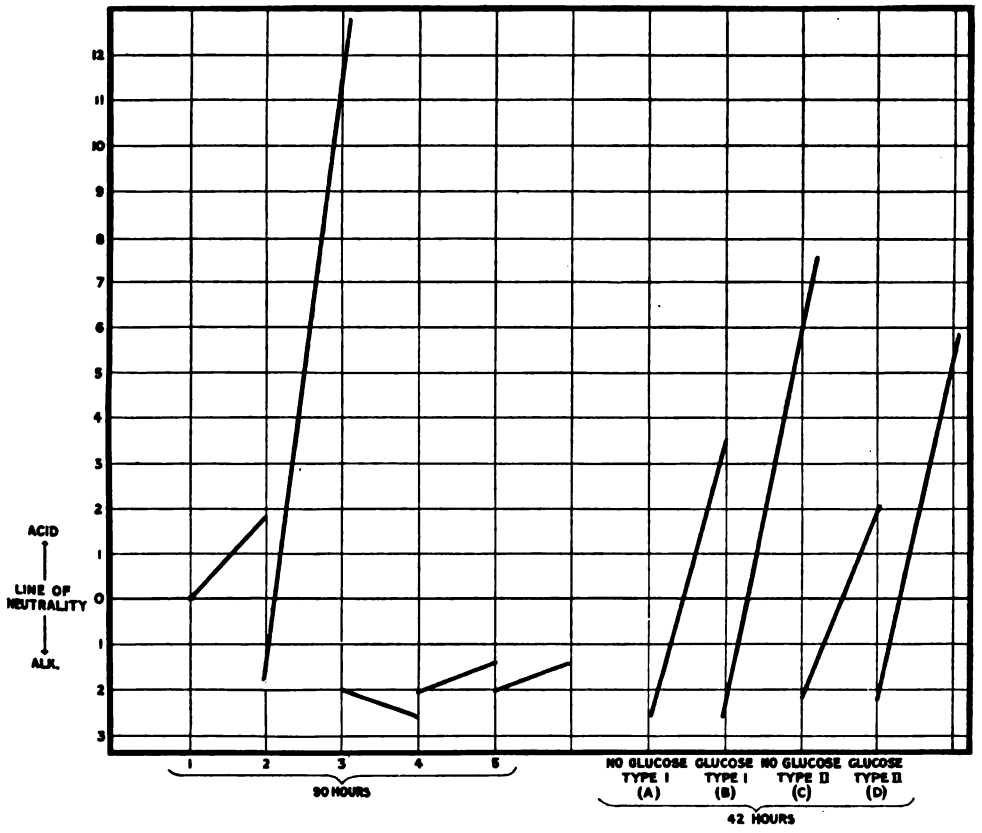
(1) 2.5 cc. required 2.25 cc. N/75 $(CHOHCOOH)_2$ to neutralize it before incubation. At the end of forty-two hours it required 3.5 cc. of N/40 NaOH. (See B, Chart I.)

(2) 2.5 cc. + 0.5 gm. glucose required 7.5 cc. of N/40 NaOH to neutralize it after incubation. (See D, Chart I.)

Nature: Thick, viscous, opalescent; much mucin.

Chart I.

THE RESULTS OF OBSERVATIONS RECORDED IN EXPERIMENTS SERIES B AND C.



The results for Series B are presented on the right, and for Series C on the left. The vertical numbers indicate the relative degrees of acidity or alkalinity.

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Alkaline saliva, type II.

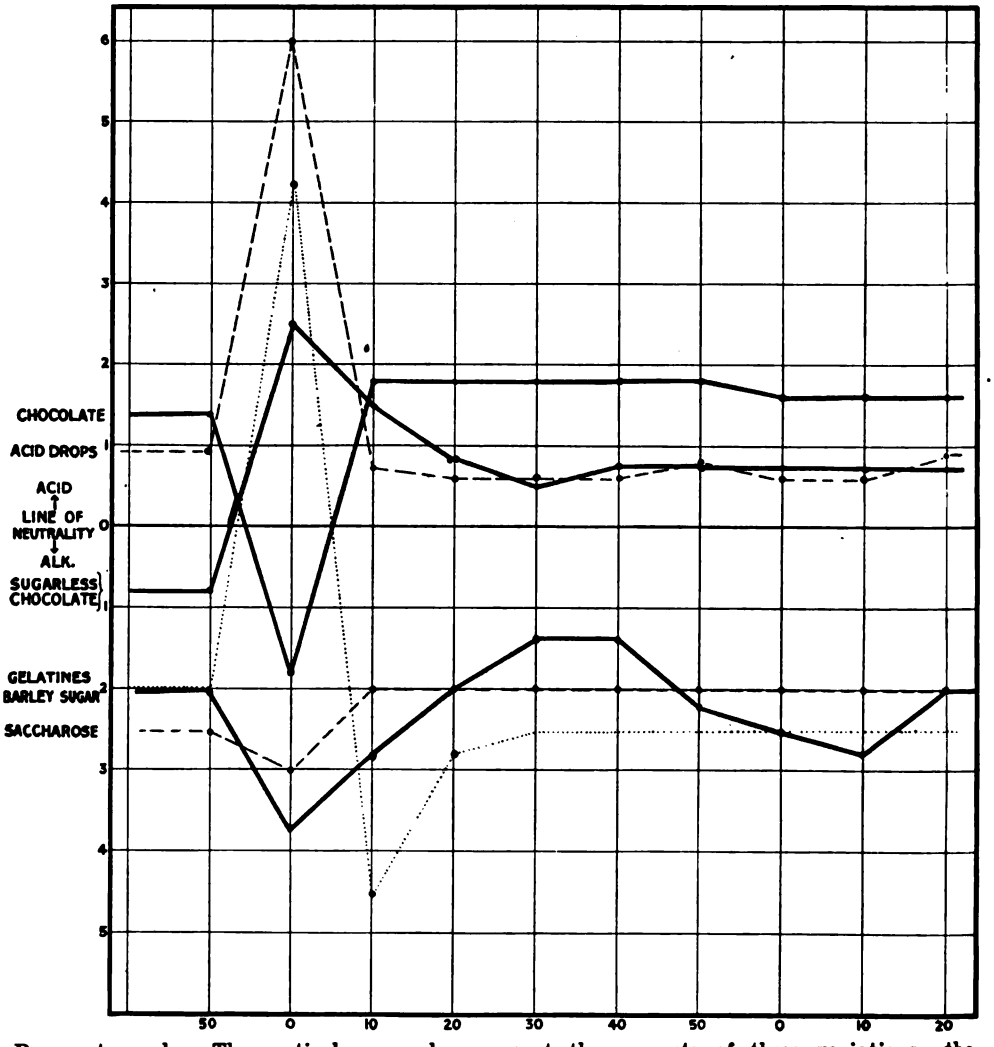
(1) 2.5 cc. required 2.1 cc. N/75 (CHOH-COOH)$_2$ to neutralize it before incubation; at the end of forty-two hours it required 2.1 cc. of N/40 NaOH. (See A, Chart I.)

Nature: Thin, watery, non-viscous; few flakes of mucin.

This shows that if alkaline saliva be put in the biological incubator it becomes acid in reaction in less than eighteen hours; that if

Chart II.

THE IMMEDIATE AND REMOTE ACIDIMETRIC AND ALKALIMETRIC VARIATIONS OF TYPE I SALIVA DESCRIBED IN EXPERIMENTS SERIES A AND D, WHEN AFFECTED BY CERTAIN CANDIES.



Drawn to scale. The vertical numerals represent the amounts of these variations; the horizontal numerals denote ten-minute observations.

(2) 2.5 cc. + 0.5 gm. glucose required 5.75 cc. N/40 NaOH to neutralize it after incubation. (See C, Chart I.)

it be mixed with glucose it becomes more acid than if unmixed, and that saliva from an immune becomes in these circumstances

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more acid than when caries-producing bacteria are present in the mouth. The presence of this sugar is, therefore, unnecessary to render an alkaline saliva acid.

SERIES C (CHART I).

Glucose.

Five test tubes washed with distilled water were used for the following:

A contained 0.010 gm. carious dentin + 0.25 gm. of glucose + 2.5 cc. water.

B contained 0.010 gm. carious dentin + 5 cc. of alkaline [2 cc. N/75 $(CHOHCOOH)_2$] saliva, type I, + 0.25 gm. glucose + 2.5 cc. water.

C contained 0.010 gm. carious dentin + 5 cc. alkaline saliva (as in B).

D contained 0.050 gm. carious dentin + 5 cc. alkaline saliva (as in B).

E contained 0.100 gm. carious dentin + 5 cc. alkaline saliva (as in B).

All tubes were placed in the incubator on July 5th, at 7.30 P.M., and examined on July 9th, at 12 noon—that is, ninety hours after incubation. (See Chart I.) The results showed that, to neutralize—

2.5 cc. of A req. 1.75 cc. NaOH.
2.5 cc. of B " 12.75 cc.
2.5 cc. of C " 2.5 cc. $(CHOHCOOH)_2$.
2.5 cc. of D " 1.5 cc. $(CHOHCOOH)_2$.
2.5 cc. of E " 1.5 cc. $(CHOHCOOH)_2$.

These experiments showed that sugar solution, in itself neutral in reaction, becomes acid in the presence of caries-producing micro-organisms; that in the same circumstances, if alkaline saliva be added, it becomes enormously acid; that the alkalinity of saliva is practically unaffected by the presence of caries-producing micro-organisms; and that a few bacteria are as potent in the mouth as many.

SERIES D (CHART II).

(a) *Acid drops* (druggists').

Saliva, type I, collected during hours of fasting between 10 and 1 o'clock, after brushing the teeth and rinsing the mouth with warm water. Type I, tested: 2.5 cc. were found to be acid, and were neutralized by 0.9 cc. N/40 NaOH solution.

2.50 P.M., 2.5 cc. (acid) required 0.9 cc. N/40 NaOH solution.

3.00 P.M., 7 gm. acid drops were dissolved in the mouth; 28 cc. were collected, and required 6 cc. solution for neutralization.

3.10 P.M., 2.5 cc. saliva required 0.75 cc.
3.20 P.M., 2.5 cc. " " 0.70 cc.
3.30 P.M., 2.5 cc. " " 0.70 cc.
3.40 P.M., 2.5 cc. " " 0.70 cc.
3.50 P.M., 2.5 cc. " " 0.80 cc.
4.00 P.M., 2.5 cc. " " 0.70 cc.
4.10 P.M., 2.5 cc. " " 0.70 cc.
4.20 P.M., 2.5 cc. " " 0.85 cc.

(b) *Plain chocolate.*

1.50 P.M., 2.5 cc. acid saliva, type I, required 1.4 cc. N/40 NaOH solution for neutralization.

2.00 P.M., 7 gm. plain chocolate were dissolved in the mouth, and 18 cc. collected; 2.5 cc. of the alkaline filtrate were ultimately neutralized by 1.8 cc. N/75 $(CHOHCOOH)_2$.

2.10 P.M., 2.5 cc. saliva required 1.8 N/40 NaOH.

2.20 P.M., 2.5 cc. saliva (stained brown) required 1.8 N/40 NaOH.

2.30 P.M., 2.5 cc. saliva (stained brown) required 1.8 N/40 NaOH.

2.40 P.M., 2.5 cc. saliva (clear) required 1.8 N/40 NaOH.

2.50 P.M., 2.5 cc. saliva (clear) required 1.8 N/40 NaOH.

3.00 P.M., 2.5 cc. saliva (clear) required 1.6 N/40 NaOH.

3.10 P.M., 2.5 cc. saliva (clear) required 1.6 N/40 NaOH.

3.20 P.M., 2.5 cc. saliva (clear) required 1.6 N/40 NaOH.

3.30 P.M., 2.5 cc. saliva (clear) required 1.6 N/40 NaOH.

(c) *Barley sugar.*

2.50 P.M., 2.5 cc. of alkaline saliva, type I, required 2.0 N/75 $(CHOHCOOH)_2$ for neutralization.

3.00 P.M., 7 gm. of barley sugar were dissolved in the mouth and 16 cc. collected: 2.5 cc. saliva (straw-yellow, viscous) required 3.75 cc.

3.10 P.M., 2.5 cc. saliva (clear) required 2.8 cc.

3.20 P.M., 2.5 cc. saliva (less viscous) required 2.0 cc.

3.30 P.M., 2.5 cc. saliva (less viscous) required 1.6 cc.

3.40 P.M., 2.5 cc. saliva (less viscous) required 1.5 cc.

3.50 P.M., 2.5 cc. saliva (less viscous) required 2.25 cc.

4.00 P.M., 2.5 cc. saliva (less viscous) required 2.50 cc.

4.10 P.M., 2.5 cc. saliva (less viscous) required 2.75 cc.

4.20 P.M.—No observations made.

4.30 P.M., 2.5 cc. saliva required 2.0 cc.

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The probable reason why barley sugar was alkaline throughout was because it was manufactured from cane sugar, which is not inverted in the mouth unless it comes into contact with some acid reagent or some dilute mineral acid, when it takes up water and is split into equal parts of dextrose and levulose (both glucoses)—thus:

$$\underset{\text{Cane sugar.}}{C_{12}H_{22}O_{11}} + H_2O = \underset{\text{Dextrose.}}{C_6H_{12}O_6} + \underset{\text{Levulose.}}{C_6H_{12}O_6}.$$

Cane sugar, as found in ordinary table crystalline white sugar, remains as cane sugar unless the secretions of the mouth are acid.

(d) *Sugarless chocolate.*

5.20 P.M.. 2.5 cc. acid saliva, type II, required 0.8 cc. N/75 tartaric acid solution for neutralization.

5.30 P.M., 7 gm. of sugarless chocolate were dissolved in the mouth and collected. This was filtered, and next day the filtrate was tested. It required 2.5 cc. NaOH for neutralization.

5.40 P.M.,	2.5 cc. saliva	req.	1.5 cc. NaOH.
5.50 P.M.,	2.5 cc. "	"	0.8 cc. NaOH.
6.00 P.M.,	2.5 cc. "	"	0.5 cc. NaOH.
6.10 P.M.,	2.5 cc. "	"	0.65 cc. NaOH.
6.20 P.M.,	2.5 cc. "	"	0.60 cc. NaOH.
6.30 P.M.,	2.5 cc. "	"	0.6 cc. NaOH.

Chocolates vary remarkably in their constituents. Some contain from 50 to 55 per cent. cane sugar, 18 to 25 per cent. fat, 1 per cent. fibrin, a certain amount of "reducing" sugar, and varying amounts of wheat starch and arrowroot. It is probably to the latter that the harmful effects are due. Chocolate is frequently rendered alkaline by the addition of ammonia or sodium or potassium carbonates in order to emulsify and saponify the fats in the cocoa and make it more soluble.

(e) *"Gelatines."*

2.50 P.M., 2.5 cc. of alkaline saliva (type I) required 2 cc. N/75 $(CHOHCOOH)_2$ for neutralization.

3.00 P.M., 7 gm. of gelatines were dissolved in the mouth, 32 cc. being subsequently collected. The filtrate required 4.25 cc. N/40 NaOH. (Pale brown, viscous.)

3.10 P.M., 2.5 cc. saliva (clear) required 4.75 cc. N/75 $(CHOHCOOH)_2$.

3.20 P.M.,	2.5 cc. saliva (clear)	req.	2.75 cc.
3.30 P.M.,	2.5 cc. " "	"	2.75 cc.
3.40 P.M.,	2.5 cc. " "	"	2.50 cc.
3.50 P.M.,	2.5 cc. " "	"	2.50 cc.
4.00 P.M.,	2.5 cc. " "	"	2.50 cc.

"Gelatines" are believed to be flavored slightly with citric or tartaric acid.

SERIES E (a).

A large piece of carious dentin including both deep and superficial layers, removed from a freshly extracted tooth, was placed in a test tube containing peptone beef broth, and incubated. At the end of seventy-two hours the fluid, having become turbid, was removed, and tubes of sterilized nutrient agar kept fluid at a temperature of 48°C., inoculated by means of two platinum öses of broth. Petri dishes received the melted carious agar solution, and into each of these was placed at one side of each dish (i) plain chocolate, (ii) "cream" from chocolate cream, (iii) acid drops, (iv) caramel, (v) toffee, (vi) barley sugar; a control (vii) was simultaneously prepared.

The results at the end of twenty-four hours gave the following particulars:

(1) Plain chocolate was bacteriophile, the colonies closely applying themselves to the sweetmeat; a "condensation band" 3.5 cm. wide, where the colonies were exceedingly numerous, was present.

(2) "Cream" had a semi-halo of colony-free material measuring 4 cm. in diameter, and a "condensation band" of 1 cm.

(3) "Acid drops" was almost similar, the semi-halo measuring 4 cm. and the "condensation band" 1 cm.

(4) Caramel had colonies closely approximated to the sweetmeat.

(5) Toffee had a growth measuring 4.5 cm. in width close up to the material, and "condensation band" of 1 cm. in width.

(6) Barley sugar had a semi-halo of colony-free material 5 cm. wide and "condensation band" 1.25 cm.

(7) The control had numerous colonies equally distributed. These were mainly small, discrete, round, capitate, smooth, homogeneous, homochromous, with entire edges. It was unnecessary to make a qualitative examination of them.

Thus it would appear that chocolate, caramel, and toffee were bacteriophile, and "acid drops," "cream" from chocolate, and barley sugar were bacteriophobe.

SERIES E (b).

Litmus agar was used for these experiments. After incubation for fourteen hours, acid drops, chocolate, chocolate cream, and barley sugar turned the blue into a pink color for some distance around the edges. The control used retained its color, showing that the caries-producing micro-organisms *per se* had not acidulated the medium in which they were growing. They were those associated with deep-seated dental caries.

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SERIES F.

This group includes the use of sound teeth, premolars and molars, treated in two ways: (1) So placed that candies were made to lodge between them, and (2) containing artificially prepared cavities in their crowns.

On June 5th, certain sound teeth were embedded in quickly setting superfine plaster of Paris side by side, so that their mesial and distal surfaces were almost approximated. After extraction they were at once washed and immersed in 30 per cent. alcohol, and throughout the operations were kept moist in order to prevent any superficial minute cracking of the enamel. In this way three pairs of maxillary premolars, three sets of three maxillary premolars, three pairs of one maxillary premolar, and one set of three mandibular premolars were employed. Rubber dam was stretched between the teeth over the plaster, which was covered with a layer of shellac in order to prevent the saliva from acting upon the plaster. The cavities varied in size, but approximately measured $4 \times 3 \times 3$ mm. Salivas of types I and II were collected.

On June 10th, at 7.30 P.M., in a stoppered jar were placed two premolars, and squeezed in an interstitial position between them was caramel, and type II saliva (acid) used, and also in the crown cavity, and type I (alkaline) chocolate, and also in the crown cavity, and in another jar toffee.

On June 25th, at noon, into the beforementioned cavities were placed plain chocolate, caramel, acid drops, and a "control" of nothing was made—in which, however, of course the saliva was allowed freely to enter or collect. The reactions of the salivas were tested, and all had become acid fourteen hours afterward, but in order to keep the originally alkaline saliva of type I alkaline, two platinum öses of calcium carbonate and four of sodium carbonate were added. These were examined on July 19th, at 4 P.M.

Jar No. 5, containing type I saliva which had become strongly acid, and a premolar and molar with plain chocolate placed interstitially and on the crowns, was removed from the incubator. Two or three soft spots in the fissures of both teeth, but the molar especially, had developed during the forty days of incubation and easily admitted the end of a fine needle, the digital sensations being practically identical with those associated with the initiation of dental caries in the mouth. There was slight discoloration of the enamel on the approximal surfaces, but macroscopically no dissolution of the hard tissues.

Similarly, jar No. 36 was examined. Caramel had produced in saliva type II, which had become very acid, two soft spots, each admitting penetration by the point of a needle. In addition there were patches of discoloration opposite each other on the approximal surfaces of the teeth.

Summary.

To sum up: There are evidences of an inductive character—(*a*) That alkaline saliva when kept at body temperature, as in the biological incubator, soon becomes acid in reaction without any alien additions; (*b*) that the presence of glucose increases this acidity; (*c*) that caries-producing bacteria do not increase this acidity; (*d*) that sugar solutions (glucose) become acid when these bacteria are present; (*e*) that the alkalinity of saliva is unaffected by their presence; (*f*) that a few bacteria are as potent as many; (*g*) that "acid drops," "barley sugar," etc., are bacteriophobe, and chocolate, "caramel," toffee, etc., bacteriophile; (*h*) that the salivary reactions, disturbed by the use of sweetmeats, return to the normal almost immediately; (*i*) that while plain chocolate increases the acidity of the saliva, sugarless chocolate, "barley sugar," "gelatines," etc., are particularly innocuous; (*j*) that superficial changes in the enamel leading to decalcification of that tissue can be set up by such sweetmeats as chocolate and "caramel" in the presence of very acid saliva, from the mouth of an immune as well as from the mouth of a non-immune.

The last statement is an exceedingly important one. It is correct, and at present its significance cannot be estimated.

MALPOSITIONS OF THE TEETH.

As has been already remarked, the irregular position the teeth may occupy

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in the dental arch has been considered a local predisposing cause of caries, for the simple reason that the cleansing of the surfaces of such malposed organs is difficult, if not at times impossible. We are also informed that areas exist around the neck of each tooth. Food accumulates in these positions, ferments and caries theoretically is started. This may be true; it may be partially true, and it may be untrue. If it were always true one would expect to find interstitial caries all the time at the cervical and gingival region; and we know that this is not the fact.

Now, there may be a valid reason why this does not occur, It is just possible that the micro-organisms inhabiting the gingival trough manifest a distinct antibiotic action with regard to the caries-producing organisms.

What are the contents of the gingival trough in a normal mouth?

Working in conjunction with the bacteriologist of the Royal Dental Hospital of London, I found micro-organisms present in the gingival trough in each of seven selected patients who possess normal mouths.

The following are the brief histories of these cases:

(*A*) Girl six years. Nasal breather; no caries; fillings in the mandibular first molars; the gingival trough of the first right and left maxillary incisors was examined; depth 4 mm.

A sterilized point, passed into the trough, conveyed micro-organisms to a cover-glass of a microscope slide, which on examination showed numerous bacteria, bacilli, and micrococci. Peptone broth inoculated. After forty-eight hours a marked general turbidity occurred. Plated on agar. Result: Numerous streptococci and a large colony-forming organism.

(*B*) Girl of six and one-half years. Healthy mouth. Nasal respiration. The oral cavity was washed with a weak formalin mouth-bath (about 2 per cent.) twice daily for seven days. No caries; no gingivitis. Culture taken from gingival trough 2 mm. deep around maxillary right canine. There was a history of earache. Result: Three varieties of colonies—(i) small, white, streptococcus-like; (ii) medium, white opaque; (iii) large, white, some grayish-yellow in color.

(*C*) Girl of eleven. Nasal respiration; no gingivitis; no caries. Examined the gingival troughs of second maxillary left incisor and left maxillary canine. Depth approximately 2.5 mm. Inoculated from contents a tube of peptone broth. After forty-eight hours a turbidity with visible clumps and small flocculi occurred. Plated agar. Result: Numerous streptococci and unidentified micrococcus.

(*D*) Boy of twelve. Nasal respiration; left mandibular molar, slight decay. Examined gingival troughs of first and second left maxillary incisors; trough approximately 2.5 mm. deep. The gum and teeth were dried with cotton, the edge of the trough being everted with sterilized points and a sterilized platinum needle passed into it without touching the surface of the tooth.

Inoculation of peptone broth was made. After forty-eight hours the turbidity due to the presence of visible clumps of bacteria was noticed. Plated out on agar. Result: Numerous streptococci, also an unidentified micrococcus.

(*E*) Boy of twelve. No caries; no gingivitis; nasal breather. Rubber dam was passed over the two first maxillary incisors, which were then well swabbed with absolute alcohol. Cultures placed in bouillon. Gingival trough depth on one side 2 to 3 mm., on the other side 3 to 4 mm. Result: Long filamentous bacilli, with shorter forms, were seen in films taken direct from the trough. No growth in the peptone broth observed; no growth on the subculture on agar.

Subcultures were therefore made seven days later on glycerin agar and on glycerin blood-agar, with no result. There was probably present, however, a leptothrix difficult to cultivate. A slight preparation taken directly from the trough exhibited enormous numbers of bacteria and a few degenerated (?) squamous epithelial cells, the nuclei showing up faintly. Amorphous organic material, possibly food débris or broken-down cells from the oral epithelium. The bacteria are mainly bacilli; there are also filamentous organisms sending out filaments from a central clump. The degenerated (?) cells exhibit numerous bacilli in close relationship to them. Micrococci possibly present, but greatly obscured by the preponderating bacilli.

(*F*) Boy of nineteen. Normal mouth.

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Examined maxillary incisors; culture and slide preparations made. Result: A white confluent growth occurred in the former, overrunning the agar plate. Gelatin was liquefied in seventy-two hours. Under the microscope many spores were remarked, as well as a few squamous epithelial cells.

(*G*) Girl of twenty. Normal mouth. Films and cultures prepared as above. Result: Two varieties of colonies observed, (i) a streptococcus forming long chains in bouillon, giving an acid reaction in glucose, lactose, and maltose, and coagulating milk in litmus milk with the production of lactic acid; (ii) a Gram-negative micrococcus forming groups in bouillon and fermenting glucose and maltose.

From these it can be noted that out of the seven cases investigated, one—the last named—showed the existence of an acid-forming organism. The other materials were not specially tested out for this reaction, but it is extremely likely that had this been done it would have been found that it too contained many acid-producing organisms, inasmuch as there were in all but two (*E* and *F*) streptococcus forms, of which the greater part are usually acid-forming.

It may be therefore generally conceded that in the gingival trough of all normal mouths acid-producing organisms are present—yet caries is very uncommon in this region. What is the explanation? It may be that the parts are protected by Nasmyth's membrane, or that a state of antibiosis exists in these particular cases.

FURTHER OBSERVATIONS.

I have recently performed the following experiments in the bacteriological laboratory of the Evans Institute of the University of Pennsylvania, with a view to observing the behavior of these organisms in the presence of the food which had been prepared for deglutition by mixing with mixed saliva for one minute in an immune mouth. Alkaline saliva was used.

(1) 1 cc. of soup and mixed saliva was incorporated with litmus agar in Petri dish which had been previously inoculated with two loopfuls of bouillon infected for seventy-seven and a half hours by organisms from deep-seated dental caries.

(2) Same using boiled carrot.
(3) " " boiled potato; no salt.
(4) " " roast beef.
(5) " " lettuce leaf; no salt.
(6) " all mixed together.
(7) Control.

Examination after forty-two hours showed—

(1) Litmus agar pink in color; acid reaction; no colonies.
(3) Pink coloration; no colonies.
(4) " " " "
(5) " " " "
(6) " " " "

With regard to carrot (No. 2) it was found that at the end of eighteen hours the blue litmus agar had become slightly pink, with some colonization, probably two varieties of organisms had developed, some showing the action of their proteolytic enzymes. At the end of forty-two hours the original alkalinity of the medium had become nearly completely restored, and large masses of numerous fluent colonies had developed upon it.

The medium plated with the control culture had become slightly acid at first (eighteen hours after incubation), and at the end of forty-eight hours became alkaline in places. A large growth of colonies occurred, differing from those in the dish containing the carrot in appearance and dimensions, many being punctiform in character.

The reason why colonization did not take place is obviously on account of the fact that the saliva, alkaline at first, had during incubation become acid, thus preventing bacterial growth.

Repeated, the results are seen in Chart

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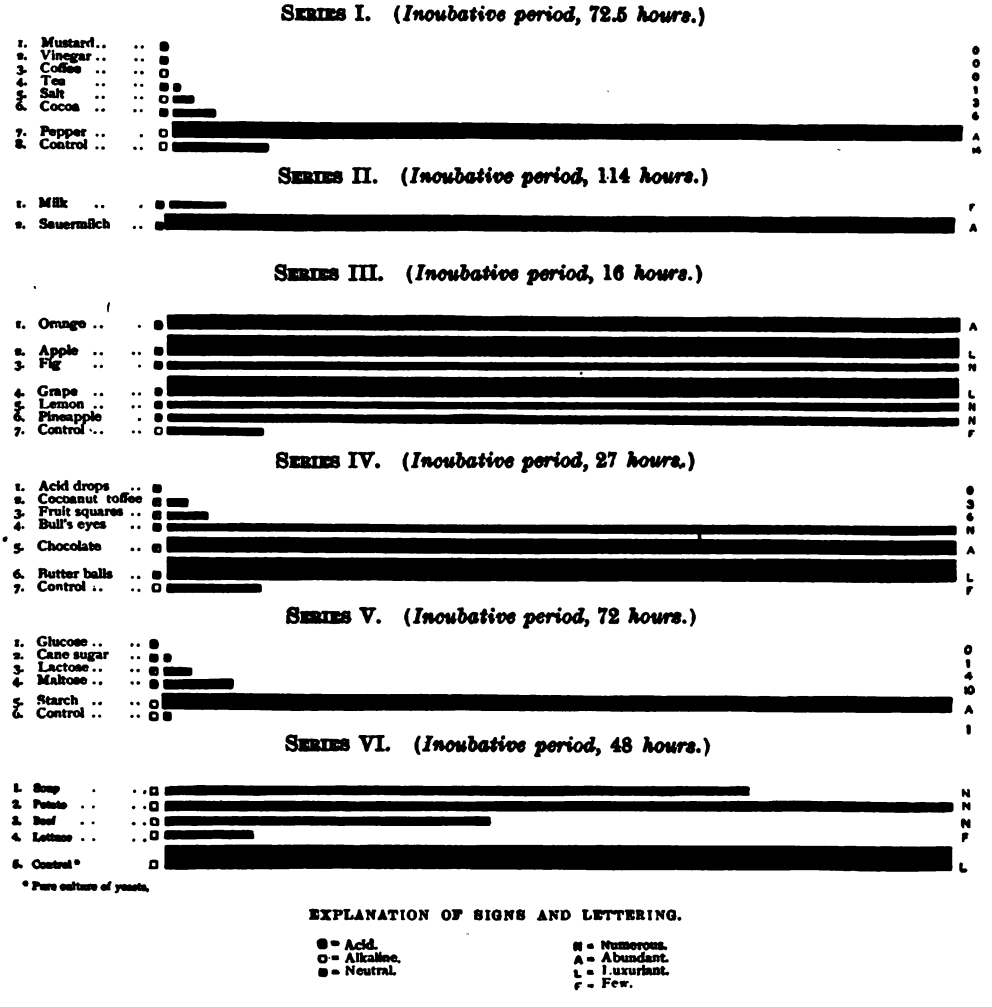
III, Series 6. The "control" consisted of a pure culture of yeasts.

The Petri dishes were again examined at the end of 240 hours. On the soup culture twelve large colonies of a deep yellow color had appeared, showing the presence of a chromogenic organism. On the potato one large orange-colored and one pale yellow colony were seen. On the control several pale yellow colonies had developed. These were, microscopically, a large micrococcus, a short sporulating bacillus, and a mixed colonization with a few yeasts. Degenerate and involution forms were present. The above were the effects of mesophilic incubation.

Seventy-two hours later, one pink colony had developed, at mesophilic temperature, on the Petri dish plated with the control inoculation.

Chart III.

TABLE OF RELATIVE GROWTH OF CARIES-PRODUCING MICRO-ORGANISMS IN THE PRESENCE OF VARIOUS DIETETIC SUBSTANCES.



EXPLANATION OF SIGNS AND LETTERING.

● = Acid.
○ = Alkaline.
◉ = Neutral.

N = Numerous.
A = Abundant.
L = Luxuriant.
F = Few.

CONCLUSION.

Toward the end of an excellent report on the "Etiology of Dental Caries" pre-

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sented to Section II of the Sixth International Dental Congress last August, Pickerill writes:

To the etiology of dental caries a large number of factors may or do contribute. There are four chief factors, two attacking, carbohydrates and organisms; and two defensive, the resistance of the enamel surface and the protective action of the salivary secretion. Each of these may vary more or less, and so the possible permutation and combinations favoring caries are approximately 24. But each of these factors is composed of a large number of contributing factors: The variations in the fermentability of the carbohydrates consumed, the number and type of organisms present, the different possible weaknesses of the enamel surface, and the varying amounts of the chemical constituents of saliva. In addition, there are the other systemic factors of internal secretions and hypernervous development. I have made a rough estimate of the possible permutations and combinations of all these factors, and find it is about 3,628,000. That is to say, in 3,600,000 cases of caries no two might have exactly the same combinations of causes. . . . There is no golden key to be discovered to unlock the riddle of dental caries.

With some of the above I am in agreement, but I feel convinced that until our knowledge of the laws of symbiosis, antibiosis, and commensalism, as practiced by the oral flora, is more exact, and our knowledge of the salivary secretion more complete, we cannot be certain as to their influence in the causation of dental caries.

If it is assumed that the number of the micro-organisms in the oral cavity must be reduced, it is plain that this can be done by hygienic means, and by the exhibition of warm water or of weak acids which inhibit bacterial growth while doing no harm to Nasmyth's membrane or the enamel surfaces;—acting on the hypothesis also that by using these measures we may destroy the beneficent influence they may possess, and perhaps alter or modify in some way the phagocytic action of cells inhabiting the oral cavity.

One thing would appear to be obvious —that the mechanical cleansing of the mouth and its contained organs is of the highest importance, that its sterilization is an impossibility, and probably an undesirability, and that the use of chemical agents and antiseptic remedies may, generally speaking, be not only valueless but sometimes actually harmful to the tissues, and should therefore be studiously avoided, unless their uses are distinctly indicated by signs and symptoms the significance of which are satisfactorily and convincingly established.

DISCUSSION.

Dr. W. B. DUNNING, New York. In discussing Dr. Hopewell-Smith's valuable paper, I shall speak from the viewpoint of the practitioner, and not from that of the chemist or biological expert. I profess to little competence in the technical procedures of the biological laboratory, which form so vital a part of the research into the great problem of the causation of dental caries.

Under the heading of "Facts," Dr. Hopewell-Smith states that "dental caries is characterized by a partial destruction of Nasmyth's membrane," and later, that "It is probably correct that the enamel cuticle when intact is a po-

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tent factor in the prevention of the attacks of dental caries." I am doubtless not in touch with the latest knowledge concerning Nasmyth's membrane, but I have never understood that that structure was other than the peripheral remnant of the enamel organ, its function having been fulfilled prior to the eruption of the tooth, and that upon eruption, this dead film of epithelial cells is soon removed by the friction of mastication. Possibly other members of this society have a similar notion concerning the nature and function of Nasmyth's membrane, and we should be interested in having the latest word thereon from our essayist.

The observations concerning bacterial life in the "gingival trough" are very interesting, but in the maze of factors to be considered in any given case, it would seem almost impossible to determine the true significance of their presence as bearing upon the fact of the relative immunity to caries of tooth structure in that region. It would be difficult indeed to prove a distinct antibiotic action on the part of such organisms as are found therein, upon caries-producing organisms. May not an equally plausible explanation be that the gingival exudate possesses such inhibitory power? Pickerill's estimation that several million possible combinations of oral factors enter into caries production or inhibition well serves to impress upon us the magnitude of the task set for our investigators. Probably the future will bring more prominently into view the influence of the internal secretions upon tooth formation, upon insufficiency in tooth structure, and upon detrimental predisposition caused by injury to the thyroid, parathyroid, and other glands. Possibly it may be found that the intricate external—or oral—powers of offense and defense are really dominated by these deeper influences controlling growth and the integrity of tooth structure. This would seem a justifiable surmise, based upon the well-known general principle that the state of the internal vitality of organs determines the susceptibility or immunity to the ever-present bacterial hosts awaiting conquest.

Be this as it may, and until we have devised better preventive means, our labors in the direction of oral *mechanical* cleanliness is surely an important prophylactic measure. I emphasize mechanical cleanliness, and fully agree with the essayist in doubting the wisdom of the use of mouth antiseptics.

Dr. F. W. Low, Buffalo. I would like to ask Dr. Hopewell-Smith to explain to us in his closing remarks why he found tartaric acid better than hydrochloric for the alkaline acid test, and what detective he used. Was it methyl orange or some other substance that he used in connection with the acid?

Dr. Hopewell-Smith. Litmus was used in connection with the acid test.

Dr. Low. We have thought that litmus was rather unreliable in connection with hydrochloric acid, and I would like the essayist to explain why he used tartaric acid?

Dr. Hopewell-Smith (closing the discussion). I think I have gotten off very lightly. It is not an easy matter to answer offhand questions asked in a discussion. I know that I have not left many loopholes for discussion, but I was very glad to hear what Dr. Dunning said about the paper. He spoke of the function of Nasmyth's membrane. Nasmyth's membrane is a very important organ, in fact it is so important, to my mind, that in teaching my class at the

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University of Pennsylvania, I take up this subject as the first line of advance in regard to the study of dental caries. Nasmyth's membrane, as I have said, persists throughout life. I have found it over the teeth of patients as old as seventy years. It does not exist entire, but it is present in every instance, and one can easily demonstrate that fact by placing an extracted tooth in a ten per cent. solution of hydrochloric acid, when almost immediately the membrane can be peeled off. It can be seen in preparations for microscopical examination, and consists of two parts, of which the outer layer is cellular, while the inner layer is laminated, and quite thick, I think at least fifty microns. It is Nasmyth's membrane which takes the stain found so commonly in children's mouths, which we call green stain; that is a stain on the membrane, not on the enamel.

Dr. DUNNING. May I ask whether the use of pumice in polishing the teeth has any effect in removing the membrane?

Dr. HOPEWELL-SMITH. I should say that it has.

Dr. DUNNING. Then patients who have had their teeth polished year after year must have lost that membrane.

Dr. HOPEWELL-SMITH. That would be possible, of course, but pumice is a bad thing for the teeth.

With regard to the contents of the gingival trough, I am not aware that there is any exudate; there is dead epithelial tissue, and, of course, saliva and its organisms, but no real so-called exudate existing in the trough, so far as I know. I am extremely glad that Dr. Dunning agreed with me in the fact that mechanical cleansing is more important than any antiseptic remedies.

Dr. Low asks why I used tartaric acid in testing for alkalinity, and also why litmus was used. This is the usual laboratory method. I have found hydrochloric acid to be destructive in these tests, and one uses litmus under the modern laboratory methods of practice, although I agree with Dr. Low that it is not a very efficient test. The apparatus used was one especially designed for testing the alkalinity of the blood, but I used tartaric acid because it is the recognized reagent for testing any fluids of the body.

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Some Advantages of Jacket Crowns.

By WM. A. CAPON, D.D.S., Philadelphia, Pa.

THE dental practitioner of the present time has such a wide range of materials and controls so many methods that a conspicuous mouth is inexcusable, providing the patient has the means and the desire. The latter is generally present, but unfortunately not always accompanied by the former.

Dental conditions are so variant that it is impossible for every dentist, no matter how perfect his equipment may be, to compass all requirements, hence the tendency to branch and follow a particular line of work. This branch or specialty is generally chosen because of a peculiar ability of experience. Many of us feel competent to practice a variety of special phases, and are compensated by satisfactory results because these branches of dentistry are so closely allied that a division could be of no advantage.

There is no section of dentistry that presents a greater diversity of dental ability than that of covering or filling spaces by bridges, and a recognition of this fact will go far toward the elimination of much disfigurement, pain, and inconvenience.

Innumerable teeth have been sacrificed for the purpose of crowning, and thousands of good roots extracted for the purpose of bridging, and countless teeth ground and eventually twisted out of their sockets in an effort to circumvent the necessity for a plate. We all make mistakes, and we have experienced the mortification which results therefrom, and have vowed to be more observant in the future.

Every dentist uses crowns, whether it be a so-called pivot—which is a misnomer, although some of them *do* pivot exceedingly well, unfortunately for the possessor!—or a beautiful porcelain crown with a platinum base, and this is the most perfect of all pin or post crowns. Many operators are using the cast base, with very beautiful and satisfactory results. A small proportion are using what is called a jacket crown, but very few know the value and extent of its application.

EVOLUTION OF THE JACKET CROWN.

This crown derives its name from the fact that it envelops a portion of the natural crown, and thereby retains the original strength of the tooth to a greater degree than if the crown is trimmed to the gum margin and the retention of the substitute depends entirely upon a

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pin, post, peg, or so-called pivot extending into the enlarged canal of the root.

Fig. 1.

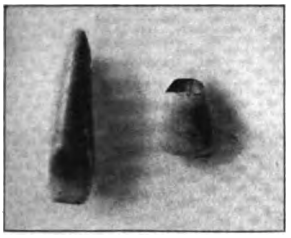


Fig. 2.

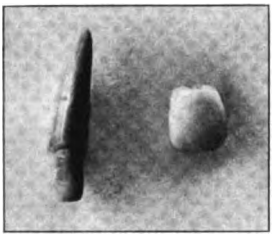


Fig. 3.

This class of work is not new; in fact, it is nearly thirty years since it was first used and given to the profession. To be accurate, it was in the year 1886 that Dr. Land described his crown as a "new method of covering teeth with porcelain." In later years the method has changed, until at the present time we have practically three kinds that can be properly placed under the term "jacket crown."

The original of this class consisted of a frame or sheath of platinum covering the prepared tooth, as shown in Fig. 1, and a porcelain veneer fused to the labial surface, leaving the lingual surface ex-

Fig. 4, A.

Fig. 4, B.

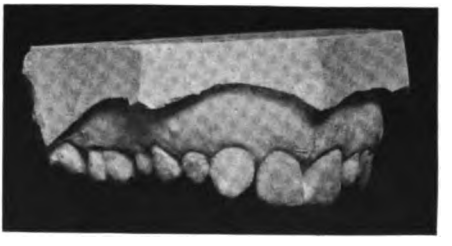
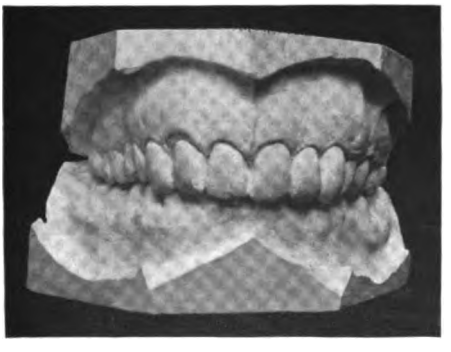


Fig. 5.



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)sed, the platinum and the whole shell :ing cemented to place. The second 'pe of jacket crown requires greater ıtting of the natural tooth, because the ngual surface is also porcelain. The 'ame is of thin foil, which is entirely portunity for easy access to the pulp should occasion arise. (See Fig. 3.)

This brief description cannot be satisfactory, but is sufficient for the present, because I will give every detail at my clinic. My faith has been pinned to the

FIG. 6.

FIG. 7.

:moved, leaving an all-porcelain shell. See Fig. 2.)

The third type of this crown is of ore recent production, and Dr. Land ılls it the "overlap," because it over-ps the tooth mesially and distally with-ıt covering the lingual portion. This jacket crown for many years, and the pictures I will show of some extreme cases may help to justify my confidence.

INDICATIONS FOR THE JACKET CROWN.

Before presenting these cases allow me to state my position regarding crowns,

FIG. 8.

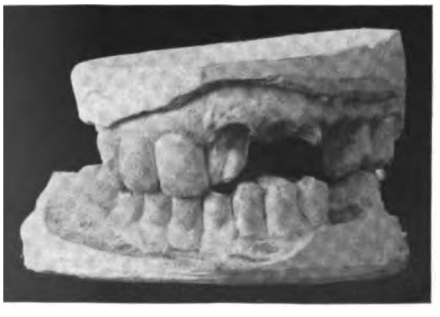

FIG. 9.

'own is also made on a foil base, and ıe metal stripped from it before the 'own is cemented into place. The ad-ıntage of this crown over that shown ı Fig. 2 lies in the absence of cutting ıe tooth lingually, which offers an op-and to place them in their proper class. They are all of the highest order of dental reparation or substitution, but the original jacket crown is my favorite, because it has practically no limitation. It is sometimes criticized as being bulky,

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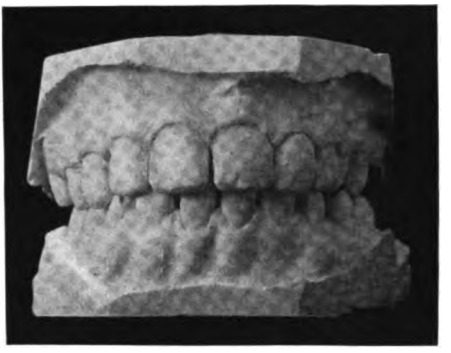
and it is claimed that the shade cannot be controlled because of the platinum background, but in this work, as in other dental operations, much depends on the operator. No doubt the work of twenty years ago or even of more recent date

FIG. 10.

deserved this criticism, but most of it is still in use and acceptable in appearance. Hundreds of these crowns were placed in almost hopeless cases where no other substitute was possible, and they are holding their own with more perfect neighbors. Vital pulps, devitalized

lower incisors are bad, they are generally very bad, and what kind of a pin crown can be used there with satisfaction? The roots are narrow and too small for any degree of enlargement without danger of perforation, yet the position re-

FIG. 11.



quires great strength in the substitute, for the leverage is enormous for a small tooth. The application of a jacket crown is just as satisfactory in these instances as in any other place in the mouth.

FIG. 12.

teeth, fractured roots, torsion teeth, "peg" or "rice" teeth, bridge abutments, deformities of all kinds, including regulating, constitute the field for this kind of crown.

Bicuspids, molars, and lower incisors are worth mentioning also, for when the

FIG. 13.

How much of this field will the other jacket crowns cover?—for they are practically alike in their application. They are useful just in proportion to the amount of tooth substance which is left to be covered. They are dependent upon a considerable amount of the original

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structure, and if that is present, there is an opportunity of making a natural-appearing and strong crown unsurpassed by any other we know of. They are particularly adapted to covering darkened teeth which have been devitalized, and the overlap crown designated by me, as shown in Fig. 3, has the advantage of necessitating less cutting of the natural tooth. The lingual surface is open and therefore reduces bulk, and allows access in case of treatment. These crowns must be used individually; therefore they have no value as a bridge abutment, and cannot be united for the strength which is sometimes required when the roots are affected by pyorrhea.

ADVANTAGES.

The skill required in making this crown consists largely in the fusing of the porcelain and strict attention to technical detail, but any dentist with a fair amount of experience in making inlays or using porcelain may expect good results, and increase his field of operations extensively.

All jacket crowns of the porcelain

FIG. 14.

FIG. 15.

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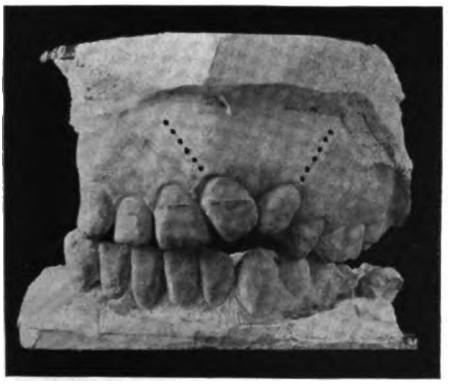
variety are exceedingly strong if they are correctly made, and, as they are not of the "cheap" variety, there is no reason for not giving time and attention to detail, and thereby reducing the possibility

Fig. 16.



of failure. These crowns being shells, there is no possible chance of reducing the value of the foundation in case of breakage, and the repairing is a much simpler operation than is the repairing of any other crown. This statement

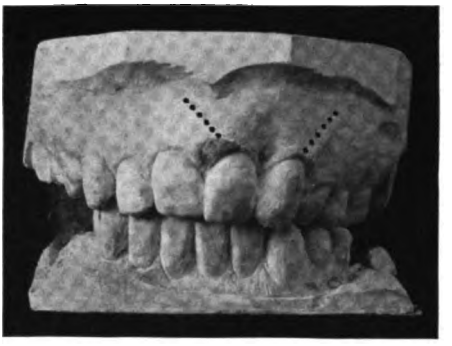
Fig. 18.

applies particularly to the platinum-base jacket crown. Figs. 1, 2, and 3 show the general form after preparation and the crowns ready for application.

PRACTICAL CASES.

Fig. 4, A and B, represents the case of a young man of twenty-two years. The central incisors are normal in appearance

Fig. 17.



and are in correct position, but the right lateral incisor is displaced by the canine and is not in alinement with the centrals. The left lateral is malformed or what is termed a "peg" or "rice" tooth. The deciduous canine on the same side is firmly in position between the lateral

Fig. 19.

and permanent canine. The position of the right canine is held by the deciduous canine, and the second bicuspid is also malformed. A radiograph fails to show the presence of the missing right lateral.

Fig. 5 is the case corrected with

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jacket crowns. The right canine was devitalized and trimmed sufficiently for a lateral, and the deficiency of space taken up by the enlarged canine covering the deciduous tooth. The exposed section at the gingival border was covered by a gum enamel inlay.

Fig. 6 represents the case of a young student athlete. The right central had been broken by an accident some years ago, and replaced by a pin crown. A recent blow broke it again and split the root lingually, also breaking the lateral and left central.

Fig. 7 shows the case corrected by three jacket crowns. The right central root was reinforced by a screw post and amalgam. The platinum frame of the crown was carried well under the gum to the margin of the fracture, and at the present time the tissue is almost in its normal position.

Fig. 8 represents the mouth of a retired well-known Philadelphia dentist, who during a severe illness broke the left canine, lateral, and central. The pulps being vital and not exposed, these teeth were crowned, in 1909. The right lateral had been crowned in 1892. This crown was re-cemented a few months ago, and the tooth is apparently as near to normal as when it was first crowned twenty-three years ago. (See Fig. 9.)

Fig. 10 shows the case of a boy of seventeen years, who had been a sickly child, and had always had poor teeth. He was placed in my charge by a den-

FIG. 20.

FIG. 21.

FIG. 22.

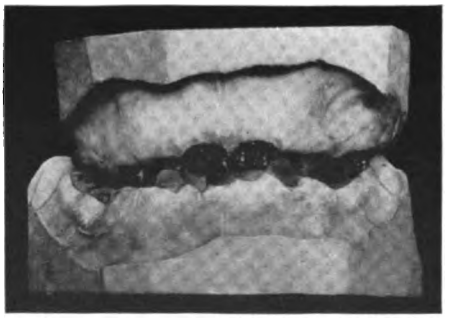
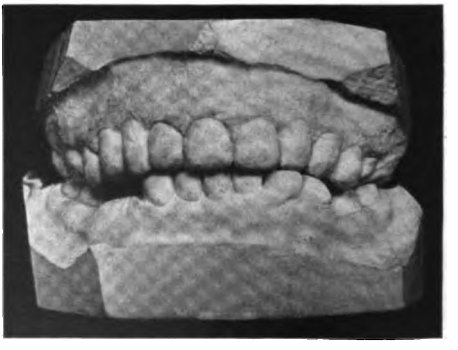


FIG. 23.



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tist from another city. In two sittings of two and one-half hours each, in the morning and afternoon of the same day, his teeth were restored as shown in Fig. 11.

Fig. 12 shows the case of a man who had been thrown from his horse. The crown and root of the left central was fractured and the pulp of the right central killed by the shock. The restoration is shown in Fig. 13.

FIG. 24.

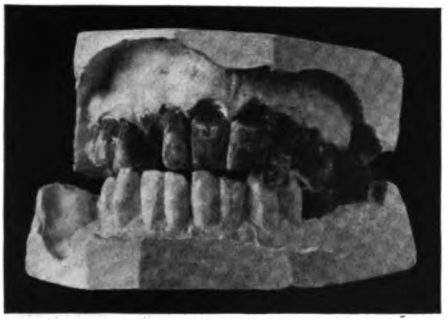
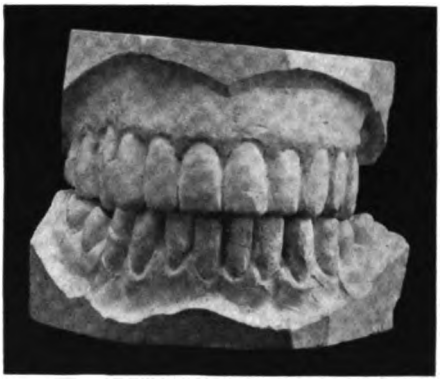


Fig. 14 shows the case of a young lady with a contracted arch and irregular teeth. She wore a plate with two small canines to fill the spaces. She had for two years undergone orthodontic treatment, but with little success. Her speech was affected by the plate, which was an "insult added to injury," because of the enlarged condition of the jaw. The condition was corrected by two small extension bridges, using jacket crowns on the right and left laterals as abutments. (See Fig. 15.)

Fig. 16 shows the space between occluding surfaces caused by non-eruption of the left lateral incisor and the angle formed by the left central and canine. This case was corrected by two jacket crowns, which produced a marked improvement in speech and appearance. (See Fig. 17.) The pulp of the central was devitalized, because the angle of the tooth required extreme cutting. The dark patch shows a gum enamel inlay made to make the central more complete.

Fig. 18 is a recent case selected to show the use of the jacket crown as a bridge abutment. This patient is fifty-six years of age, and a tobacco-chewer, hence considerable confidence must be placed in the strength of this crown

FIG. 25.



under such circumstances. (See Fig. 19.)

Fig. 20 represents an extreme condition of abrasion, which was corrected largely by the use of the jacket crown. The lower anterior bridge was supported by these crown abutments and stood the strain for ten years, after the facings of the soldered teeth had been broken away. (See Fig. 21.)

Fig. 22 is the case of a girl of fifteen, the most extreme of its class. Every tooth was devoid of enamel and stained dark brown, with several teeth unerupted. The bite was raised by shell crowns on the molars, and sixteen other teeth were covered with jacket crowns. No devitalization was necessary, the only

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inconvenience and pain being caused by the preparation of the teeth at the gingival margins. The remaining spaces were left for the possible delayed eruption of teeth. This was the most extensive reparation I have made, and a dental success, but the change in facial expression was much objected to by the child's mother. (See Fig. 23.)

Fig. 24 is a recent case and represents the mouth of a man of thirty-six. This condition was caused by neglect through discouragement, for the patient had had much dental work done, but failed to keep it in presentable condition. He is wearing partial upper and lower gold dentures to supply molars. Gum enamel was fused to the margins of the centrals to replace the receded gum. In order to make a strong clasp tooth on the left side, I united the two bicuspids, which were loose and had an extreme forward angle, made a foundation covering both teeth, and then carved what could be called "twin teeth;" thereby securing stability and natural appearance by correcting the angle and unsightly condition. (See Fig. 25.)

DISCUSSION.

Dr. W. D. Tracy, New York. The essayist's subject is an exceedingly vital one, and presents many different phases. The jacket crown, I believe, is an appliance the merits of which have not been sufficiently recognized, but it seems to me that it has a good many limitations. Dr. Capon says that any man of average ability with little effort and time should be able to make a jacket crown, but I think the operators who are successful in handling porcelain are men to whom this kind of crown most naturally appeals, and I know a great many who have conscientiously tried to use porcelain without satisfactory results. The technique of porcelain work, in my opinion, requires constant application and long experience before it can be perfected, which is one of its limitations. The field of application of this appliance, as shown by the essayist's pictures, is very wide. There has been some question in my mind in the last few years as to whether I have been doing the right and proper thing in placing jacket crowns on teeth with vital pulps. Dr. Capon, whom I have known very pleasantly for many years, however, assures me that there will never be any trouble from covering vital teeth with jacket crowns. Some of my New York friends tell me that they have not for a number of years put any kind of crown over a vital tooth, for the reason that, when a vital tooth is covered and the natural influence of the fluids of the mouth is shut off from the tooth, it is placed in an abnormal condition and will undergo retrograde changes, and eventually, even though the patient may not know it, histological changes that will result in disease conditions. This I believe to be true if the tooth has been ground down very much. Teeth which have been liberally ground and then crowned are apt to suffer histological changes of the pulp, but Dr. Capon's

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method requires little radical grinding. It is quite likely, however, that in his practice conditions may be different from what they are in mine, because the technique which I have employed has always included the stripping of the enamel periphery of the tooth, leaving a well-defined shoulder at the free margin of the gum. In my early efforts I tried to go under the gum, but I found that this was unnecessary, or rather was detrimental to the gingival margin, as the gum tissue would not take kindly to the crown.

With regard to the overlap crown, I realize that in some cases this would be serviceable, and might help the operator out of certain problematic troubles in dealing with eroded or abraded teeth. In crowning such teeth strength on the lingual aspect is required, and the retaining groove enables the operator to make a nice restoration, but I have had no experience with that form of crown. I would like to have Dr. Capon express himself in regard to the clinical observation of teeth crowned in this manner, and to state whether there are many instances where he has to open through the crown to take care of devitalized pulps. I have had little trouble in opening through jacket crowns. Some of my friends contend that the radiograph would undoubtedly show pulpal changes to be due to placing jacket crowns over living pulps. In consideration of the light of the more recent knowledge of asepsis, and a little closer understanding of the delicate organism of the pulp and its disturbances, I have been promising myself, when I shall have the opportunity, to make some radiographs of crowned teeth which have been in the mouth eight or ten years, to note the condition of their pulps.

We are all familiar, of course, with the superior character of Dr. Capon's work, and I presume no one has made a more careful study or has been more successful in the universal application of this work in complicated cases.

Dr. G. H. Butler, Syracuse. In regard to the jacket crown, if I could do this work, perhaps I would like it better. Dr. Tracy has said so nearly what I had in mind as to the behavior of the pulp under these crowns, and said it so much better than I could, that I can only indorse his statement.

In the average cases, it seems to me, if there is enough tooth substance left to hold the crown, that it will be bulky and too prominent, and, if enough of the tooth structure is cut away to give strength to the porcelain, it will be at the risk of permanence. I have always worked upon the principle that there is little value in a band without a pin. I leave as much tooth substance on the buccal portion of the tooth as possible, and for that reason I appreciate the advantages of the jacket crown.

The essayist's special cases are all very interesting to us, and while looking at his pictures I thought of one case that I had to deal with in which conditions were somewhat the same as shown in one of the pictures. In this case a bridge was fastened to a second molar and a canine. The molar was fairly loose, but I had reason to believe that one of its buccal roots was healthy. I therefore cut the tooth in two and extracted the other two roots, leaving a fairly good, solid root upon which I tried to anchor a bridge. This was done over two years ago. When I saw the case only a few days ago, the bridge was still solid, and the gums were perfectly healthy around the single root.

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As for fastening bridges to open bands around bicuspids and canines for putting in a first bicuspid, with a bar running from one of the incisors back of the canine or even back of the lateral and canine, I think this to be very poor practice. In order to avoid the use of fused porcelain, and still have strength, in cases where there is a long enough bite I have had a good deal of satisfaction in using Logan crowns with bands. I am a believer in bands, but they must not go very far under the gum and must fit the root, and, from an experience of thirty years, I know that bands can be made to go under the gums without causing irritation. If an operator has no furnace and cannot bake porcelain for these long-bite cases, and still wants strength without wishing to have any gold showing, he may derive great satisfaction from using the Logan crown, grinding out a hollow place so that platinum can be burnished in the recess clear to the pin, and when that is filled with solder, an attachment is obtained not only to the pin but to the band, and a very good abutment for a bridge is secured.

We sometimes have adult patients in whose mouth a single tooth begins to protrude considerably. Age, of course, precludes orthodontia treatment, but I have had satisfaction in making in such cases a Jackson appliance with a finger spring that will slip over the front of the tooth to hold it. I have patients wear this appliance at night only, thereby preventing protrusion of the tooth and the unsightliness of such a condition.

Dr. L. A. TIMERMAN, Fort Plain. I am very glad indeed to learn the possibilities of this kind of work. It is truly a surprise to me that such work can be done so beautifully and permanently. We have reached the day of specialism in dentistry, and I do not believe that the general practitioner can do this work successfully. A number of years ago I took up this work and tried to get results, but I have never been pleased with my porcelain work, and have decided that I must be one of the men Dr. Tracy spoke of, who lack the ability to use porcelain. I was really surprised to see such restorations and to know that they are so durable as to last for twenty years. I have seen a number of these crowns, but felt that they were weak and could only be used in cases of delicate people who did not expect to use their teeth very strenuously. In the case shown by the essayist in which the crowns have lasted twenty-three years, I would like to know how the color of these crowns compares with the natural teeth?

Dr. CAPON. There was not much chance of change, because all the anterior teeth were crowned.

Dr. C. K. BUELL, Buffalo. I have had some experience with porcelain jacket crowns, but very little with the class which Dr. Capon calls the first type, because as soon as I learned of the second type, I discarded the first type for the reason that the first type possesses the imperfection of the platinum lining back of it, and I could make a crown of the second type that in my estimation was stronger than one of the first type. The third type I have had no experience with whatever.

I can give testimony after fifteen years' experience in placing a great many of them, and I can recall but two cases in which I have had any trouble with the pulp, and in either case I could not attribute the trouble to the crown.

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The one case was that of a young boy who, in cranking his father's automobile, was struck by the crank in the face, fracturing one of his teeth. It was three weeks before I saw the case. The pulp then responded, but after the crown had been on the tooth for about four weeks, the pulp died. I had very little trouble in going through the porcelain to remove the pulp—it was as easy as it would have been to penetrate normal enamel. The other case was that of a boy who in skating fell on the ice, receiving a very severe blow which broke off one of his teeth. The tooth was not only broken off, but loosened in its socket. The case was treated for some time before the boy came into my hands for the final crowning of the tooth, and the pulp died after the crown was placed. Those are the only two cases I have had any trouble with.

The use of crowns of the first type as abutments has never appealed to me. I have always felt that a bridge should have an abutment which would be more secure than an abutment of this class, moreover, in case of fracture, a repair is fairly difficult. In one of my patients twelve of the crowns of the second type have been in the mouth for nearly eleven years, and last summer I had an X-ray taken, and so far as we could discover, the pulps of these teeth had undergone no change.

With reference to lasting quality, I do not think that there is any crown that we can place upon any tooth that is stronger than the porcelain shell crown.

Dr. GEORGE EVANS, New York. I have been acquainted with Dr. Capon for many years. Some twelve or thirteen years ago, when I was chairman of the clinic committee of the First District Dental Society, I invited Dr. Capon to come to the district meeting and demonstrate to us this specialty, because I was aware of the fact that the profession as a whole was not acquainted with his ability in this line of work. Dr. Capon at that time demonstrated almost the same topic as he has shown tonight, but a good many operators who saw his work at that time seem to have forgotten that such work was ever done. I have seen this work and I can testify to the truthfulness of all the statements that have been made this evening.

At the dedication exercises of the Evans Institute, I had the opportunity to see the work which the essayist presented on that occasion, and can therefore testify to the correctness of his contentions. There is one point, however, which I would like to have Dr. Capon discuss, namely, the use of platinum. Collars are made today largely of coin gold, which contains ten per cent. copper and oxidizes under the gum margins. In mouths with acid saliva it oxidizes considerably, and acts as an irritant.

Now, what have we as a substitute? Platinum is the only metal that should go under the gum margin to any extent in acid mouths, especially in cases of pyorrhea. Even gold crowns should be made so that the portion extending under the gum margin is platinum. I have made such crowns for twenty-five years, and I have some specimens that I made to show the students of the Baltimore College when I lectured there twenty-five years ago. In these crowns the collar section is made of platinum and the other portion is built of gold and porcelain as in ordinary crowns. Platinum under the gum margin resists the action of the fluids of the mouth better than all other metals, is next to porcelain, and the secret of Dr. Capon's

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success rests in the fact that, by the use of platinum and porcelain, he avoids that irritation at the gingival margin more or less of which is present in all gold work.

A woman patient of mine presented herself at my office the other day in whose mouth I had placed two central incisor crowns made with platinum collars, twenty-five years ago, the natural teeth having been broken off in an accident. I made these crowns with platinum collars, and today the absorption around the gingival margin is hardly perceptible; but if these collars had been made of coin gold the gingiva would probably be above the margin of the collar. Dr. Capon obtains similar results in his porcelain work.

The fear of pulps dying under crowns need not worry us a great deal. Once in a while pulps die under crowns, but the proportion of these is no greater than that of those which die from other operations. I do not believe in the indiscriminate removal of pulps from teeth that are to be crowned. Pulps should only be removed for some good reason, or when they are in a pathological condition. Supposing the pulp does die in a tooth crowned in this way, or supposing a fracture of the porcelain occurs in a jacket crown, then there is no great harm done, because the pulp can be removed, or a new crown made.

MEMBER. I would like Dr. Capon to explain a little more fully the use of the jacket crown as a bridge abutment. Does he simply fuse to the crown or to the metal frame?

Dr. B. S. HERT, Rochester. I have used the jacket crown to some extent and have found it to be a very successful method of restoring anterior teeth. I have placed such crowns over vital pulps, and never so far have had pulps die under them. I would like to hear more about the third type of which the essayist spoke. How frequently does he use it? and how advantageous is it as compared with the jacket crown?

Dr. H. E. S. CHAYES, New York. I would ask your indulgence for a few moments. I fully indorse the porcelain crown as one of the strongest crowns that can be made, but I want, with apologies to the chair and the essayist, to ask you to permit me to reply to some remarks Dr. Evans has made. I admire Dr. Evans and have great respect for him, and recognize the fact that as the author of a book on crown and bridge work, he wields a terrifying influence on the student mind. It is for this reason, and also in the hope that Dr. Evans will live long enough to recognize the error of his ways, that I am going to ask him to forgive me for taking issue with him. I agree with him that platinum should be placed beneath the gum margin. The fact that I went to the trouble to write an extensive article on the metallic crown, using the platinum collar and hood, and allowing it to extend beneath the gum margin, proves that I agree with him in that respect. Dr. Evans did not present the pulp proposition in a quite fair way. I am not as experienced as Dr. Evans, and believe there are few who are; yet I think you will grant me that in the past few years I have had enough experience to be entitled to speak as to whether or not the pulp should be extirpated when a crown is placed on a tooth. Cases have been referred to me from all over the land, and in hundreds I have seen pulps left under crowns because the dentists believed that this was permissible. They have not taken the trouble to test the

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pulp and have exposed the tooth to the contact of the metal and of phosphoric acid during crystallization, which sometimes requires periods of weeks. It is far better to extirpate that pulp when it is in a good condition before crowning than to wait until it has died and become infected, and has infected the periapical tissues further and thus set up trouble with which we are unable to cope. Such pulp trouble is not apparent in the mouth, but it affects the system, setting up, at some point beyond the tooth, an irritation which may require years to manifest itself.

This word of warning I want to give to the young practitioners present who have heard Dr. Evans, and, with that word of warning, I want again to assure Dr. Evans that I have the greatest respect for him, and that my remarks have not been made in any spirit of antagonism.

Dr. EVANS. As Dr. Chayes remarked on my remarks, I think it entirely out of order to raise the discussion of a subject irrelevant to the paper. If you wish to give me the floor, I shall, however, be glad to answer Dr. Chayes.

Dr. R. OTTOLENGUI, New York. I fail to see that it is out of order to discuss the question of leaving vital pulps in teeth to be crowned, when one of our prominent teachers has just read a paper on leaving such pulps intact. It certainly seems to me that the discussion of that matter would be interesting and pertinent to the subject under discussion. I want to say, if Dr. Evans can prove that teeth may safely be crowned with pulps in them, he will do more good for this audience than we can get by discussing any other subject; for there is no question before the profession today that is of more importance than just that—whether to remove pulps, whether not to remove them, and when to do either. I hope Dr. Evans will be given the floor to tell us all he knows, if he thinks he knows, as to when it is safe to leave pulps in teeth that are to be crowned.

Dr. EVANS. Many years ago, as a student of Dr. Karl Heitzmann, who was one of the greatest dental histologists, I learned to respect the pulp. I believe the essayist is of my opinion, and the rational men in the profession probably also believe as we do. This is one of the most important subjects before the profession today. I agree with Dr. Ottolengui that this is a sensible question to discuss, but I think it is a little out of place at this time. The question resolves itself into just this: We all know and acknowledge that, when a tooth is considerably ground down, there is some irritation caused to the pulp; a certain amount of calcification goes on in the pulp, and, if we have the radiographs taken which have been talked about so much this evening, we shall see calcification going on—you may term it degeneration of the pulp. Suppose it does go on, suppose that one-third of the trunk portion of the pulp is calcified, what remains? Two-thirds of the vital portion maintaining vitality in the dentin and cementum, and as long as there is a healthy portion in the apical end of the root, its vitality will maintain health not only in crowned teeth, but in teeth affected with pyorrhea.

In regard to metal touching or resting against the dentin, there is little metal in direct contact with the tooth. There are no teeth that are crowned with metal, except in exceptional cases where there is a great deal of enamel and dentin left, hence most of the metal touches the tooth structure, and even in these cases there is an intervening

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film of oxyphosphate. In some of the work shown by Dr. Capon, where he removes the front portion of the teeth, there is no metal present, and the oxyphosphate is all that intervenes between the porcelain and the dentin.

I have been a practitioner for fifty years, and I put my experience and observation against that of a man of only fourteen years' practice. I have made a practical study of pulps in teeth for twenty-five years.

Dr. OTTOLENGUI. It is an exceedingly unfortunate fact, when a matter of such importance comes up for discussion, that we cannot discuss it dispassionately and impersonally. I do not think it matters very much who makes a statement, if it be true, but I think it matters very much if a statement is made that is misleading. It does not necessarily follow that, because we have had long experience, and because we have not observed certain phenomena, that these phenomena do not occur. If you had asked me three years ago whether I could fill root-canals, I would have told you that I could. Why? I was using identically the same technique as I am using now, with all the care and skill that I am now employing, and have been employing for some twenty-odd years, with the single exception that up to three years ago I was not doing what I am doing now—namely, checking up every filled canal with a radiograph. And now looking at this work with the aid of the X-ray, what do I discover? I discover not only many teeth filled long ago that are not so well filled as I had thought them to be, but teeth that I filled yesterday not filled so well as I had thought them to be. So you see it is not a question of how long, but how accurately we have observed a thing.

Now let me say a word about the question of pulps. There is only one absolutely safe pulp to leave in a tooth, and that is the pulp in a tooth that is absolutely normal. A tooth begins to undergo pathological disturbances just as soon as it suffers from traumatism. It is not the quality of the cement, but the depredation in grinding and preparing the tooth for a crown that starts up a retrogressive metamorphosis in that tooth. Dr. Evans told us what would happen if we did this; that we will have a tooth with one-third or two-thirds of the pulp calcified and the rest doing service. Sometimes, but not always by any means. I could recite the history of more than one patient who had suffered many years from neuralgia because of the calcification of such pulps, with no infection and with no outward sign of trouble. This question of "no trouble" is one of observation; that is, you *think* a tooth has given no trouble. As has been well said, and as you will hear it better said by Dr. Grieves tomorrow, the best time to fill a root-canal is after a healthy pulp has been removed. The trouble in leaving pulps in teeth with the idea that one can drill through the crown later is this: Serious infection may occur long before patients know anything about it, and sometimes they never know anything about it, and when they do make the discovery there may be an apical disturbance which perhaps none of us can cure, which we know cannot be cured by surgical operation—in other words, a permanent disturbance. I want to say in closing that we are not nearly so apt to see teeth that give trouble after our own operations as we are to see teeth that give trouble after our neighbors' operations.

Dr. CAPON (closing the discussion). I wish to thank all of you for listening so patiently to the arguments started by

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my pictures, and the discussers for their kind remarks about me and about each other.

Pulp vitality is certainly a very vital question. Why am I showing these pictures? Why is it that I take pride in doing this particular kind of work? I have practiced just twenty-five years and have been doing this work continuously, and I think I have saved myself a lot of trouble in not worrying about the pulp. [Applause.]

Dr. OTTOLENGUI. You let your patients worry?

Dr. CAPON. My patients do not worry, and the only time that I worry is when a long interval elapses before I see my patient again. The one reason why I have such regard for the pulp when it is normal, is that I know nature has filled these canals better than I can do it. I showed you pictures of only a few cases of this work, and although I have treated hundreds of cases of various kinds, ranging from a single tooth to ten and twelve and fourteen in a mouth, the death of a pulp is rare. In seventy-five per cent. of these cases the crowns cover living pulps, and the percentage of trouble is so small that you may question my veracity if I give the correct figures. You may extirpate all the pulps you want to, but I am proud of the fact that I do not do this unless I have to, and I am going to continue this practice, because I have proofs of the value of the work in these cases and in many others which I have not shown you.

The grinding of the teeth is frequently the cause of much trouble after the tooth has been crowned. Too many teeth are ground with a dry wheel, setting up an irritation which will eventually result in the death of the pulp. Keep plenty of water on the wheel, and do not push the grinding too hard, and if you cannot prepare the tooth properly in this way, you can devitalize—you can always do that. The margins where the crown presses the gums are healthy in the majority of cases, because platinum is the medium; there is no getting away from the fact that this metal is most acceptable and non-irritating to the tissues.

With regard to using the jacket crown for bridge abutments, I advocate this work where there is a probability of showing gold, and I showed you a few instances where it has helped me splendidly.

The lasting qualities of the jacket crown have been a surprise to me as well as to others, for they do not seem to have sufficient attachment for the resistance of such power as we exert in the use of our teeth. However, they *are* strong, and I use them in cases where nothing else could be substituted. I have in my own mouth a crown that is an example of the almost impossible. The root was nearly gone and had to be reinforced with a screw post and amalgam previous to being crowned with a jacket crown. Twenty-two years of continuous and not particularly careful use do not seem to have made much impression on that crown. If we have accidents occasionally, we can easily repair them. The jacket crown never splits roots; I have never had a root split under a jacket crown.

The number three crown asked about is one that I recommend under conditions that will be explained at my clinic tomorrow. The technique of making the other crowns will also be given in detail on that occasion.

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The Relation of the Vitality of the Periapical Cementum and Adjacent Tissues to the Patient's Health and the Status of the Dental Profession.

By CLARENCE J. GRIEVES, D.D.S., Baltimore, Md.

IT has been said that there are certain events and conditions occurring in life which are so serious that they should never be taken seriously. Whatever the other application of this remark, we are assured it cannot be applied, except in the last resort, to the great equation of health, either of the individual or of the community; nor to the attitude of those kindred specialists whose duty it is to stand guard and care for the communal health—in which the dental profession should hold no second place. We are equally certain that it is only by continued neglect, on the part of the specialist and the individual, of well-known axioms leading to health and of prophylaxis in the broadest application of the term, particularly as applied to the mouth, that the patient may indeed approach the state of the fatalist and become so seriously ill that the only recourse left him is not to take it too seriously.

It might well be added that every new discovery of a health law reduces this list of unfortunates just in proportion as its truths are established to the satisfaction of all the specialists concerned and as it is impressed upon and appreciated by the public. That many such states still come within this category is unfortunately too true; such, for instance, as chronic invalidism, permanent deformity of joint and muscle, incurable anemias with defects in blood and vessels, damage to eyes, heart, liver, spleen, kidney, and nervous system seemingly beyond the realm of body processes of repair, and a host of minor ills the cure of which is well-nigh impossible to our most skilful internists unless discovered at the onset. That many of these diseases may arise through the migration of septic emboli from neglected small focal infective areas in other parts of the body, as well as about the roots of teeth which have been cared for by the dentist, has, we hope and believe, been so amply established as to need only

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constant repetition so that all may hear, and that this comparatively recent great pathological truth may sink deeply into the conscience of every dental practitioner. Indeed, enough has been said of causes; the case has been proved, and it is most important that the same attention be immediately directed to the more difficult matter of improving diagnosis, remedies, and procedure.

RADICALISM IN REMOVING FOCI OF INFECTION.

Students of internal medicine were quick to grasp these facts in the developmental diagnostic era, then just awakening to the danger of any portal for septic entry, and many of us felt that the internist was too hasty and a bit radical in his condemnation, particularly of teeth which had received some of our best operative efforts; but after several years as a consultant, with an increasing certainty that many sound teeth were and are daily being destroyed because the dentist is not consulted, the writer is also of the opinion that, after these consultations are requested, many defective teeth are retained because of the dentist's advice. The internist complains that the dentist is not sufficiently radical—a complaint which later, under the survey of the apical areas by competent up-to-date bacteriologists and pathologists, is established, and shows these teeth to be infected. That these specialists had opportunity to make tests on such teeth forcibly emphasizes the fact that they were extracted in spite of the dentist's advice. Herein lies the difficulty of the present situation, a situation in which the profession should have the help of every scientist in its ranks; it may be best illustrated by any case where the patient is ill enough to enter any hospital or consult a diagnostician, and the usual radiographic study is made of the apices about all teeth bearing fillings, crowns, or bridges from which pulps supposedly have been removed and the roots of which have been filled. The question immediately arises, if rarefied bone areas appear about all such teeth, many of which are comfortable and show no apparent clinical defect, which will the consulting dentist condemn? The answer, in the writer's experience, is that no distinction can be drawn, that with the little we know of the matter, *all must be condemned*—that any and every tooth so involved might be the focal area producing the systemic state; and who can or is willing to assume the responsibility of saying, from any means now at our command, which is periapically infected and which is not? For if we leave one dental area, all other body focal areas are blotted out in vain, and the disease progresses. We are perfectly certain that many of these teeth are as nearly functional as the best thought and technique in our profession can make them; every rarefied bone area is not necessarily an infected area; yet these are often the pulpless offenders which will show virulent cultures.

CAUTION IN REDUCING MASTICATORY EFFICIENCY.

By what means can our diagnostic methods, our medication and surgery, be so improved as to save not only these teeth and the patient's health, but our reputation, and assure the standing of our profession? That is the question. It is also quite evident that, in all matters of health, the medical practitioner is absolute, as he should be. He can obviously take no chances. If the condition be suspected as infectious, every

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portal of entry must be obliterated, for he is responsible for the patient's health. If we knew more of this matter than he, and presumably we should, as it is our matter, we should instruct him, as indeed some have tried—when it has been always found that there are few of his class who were not willing to learn, if convinced of the ability of the teacher. If we are not satisfied with this state of affairs and the internist's decision reached in a case, after he has carefully weighed the evidence based on reports of all specialists as to focal areas, let us appeal from his decision and retain the tooth, but also let us remember that we must sign the death certificate, even if the patient lingers around and finally dies with all of his teeth. There have been many instances where by order of the internist all the teeth have been extracted, presumably by some dentist. Barring unusual oral sepsis and pyorrhea, the writer could conceive of few such cases, and would protest against this procedure, for more than once it has plunged the patient into a serious gastro-intestinal disturbance, and it reduces mastication, hence indirectly nutrition, by nearly 70 per cent. It has also been remarked that the medical man would not so glibly have disposed of his patient's teeth, had he not known how perfectly artificial substitutes had been developed by the dental profession, and that it was possible at least to maintain some sort of mastication. Another question is often asked, *i.e.* would he as lightly request the surgeon to amputate the fingers, which are only indirectly concerned in nutrition, to the tune of 70 per cent., when he is aware that the artificial substitute could never become 30 per cent. efficient, as artificial teeth are said to be? The writer believes he would be justified in both decisions if the exigency of the case made for the ultimate health of the patient; for in the treatment of infection, as in the treatment of morals, the biblical rule holds, "If thine eye offend thee, pluck it out," and the health of the whole body is the health of its component parts.

ANALOGY OF TONSILLECTOMY.

Let us consider for a moment the tonsils, which rightly came in early for their share of condemnation, being the first organs to be suspected as portals of septic entry, and which still stand condemned along with the teeth as among the most noxious. In the first phase of the situation, tonsillectomy was even more generally and radically practiced than tooth extraction is today; later the question as to just how important a factor the tonsils are in human efficiency was and still is discussed, just as the teeth are now subject to survey; a greater physiologic and histo-pathologic knowledge was thus had of these organs, and other than the severe operative measures are now applied up to the point of the failure of the cells to win the fight against bacterial invasion. When the local fight is lost and resistance lowered, there is always systemic disturbance, and when the organ can no longer function it should come out, just as a tooth under like conditions.

Tonsillectomy in the meantime is being greatly improved, and the earlier operation, which frequently left the lymph areas more open to microbic invasion than before, with serious sequelæ if not death, is no longer done; in many respects this situation resembles the early efforts and some of the recent attempts at pulp conservation by mummification, only with the decided difference

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that the dentist was endeavoring to save a tissue, the laryngologist to destroy one.

LARYNGOLOGIST VS. DENTIST.

The attitude of the laryngologist all through this criticism of his work has been particularly fine; it has so many features analogous to our present condition that are well worth emulation by the dental profession as to be a most important lesson. He has gradually convinced the general practitioner that this operation, formerly considered, like dental operations, of small moment and anybody's business, can only be correctly done by one trained in his specialty. He has more carefully reviewed his operative field, as *we* should, thereby conserving much neighborhood tissue; on the other hand, he has produced an operation which eradicates every portion of tissue which might be a medium for pathogenic adaptation; he has offered willing co-operation to the internist in repeated attempts to clear up everything in his province—*which we dentists have not done.* He has not been an obstructionist, nor oversensitive to criticism, as we have, just because he operated on a sinus or a throat without general recovery of the patient from some faraway symptom; he did not resent the return of the patient by the internist for another search for some other hidden area in his field. Much of this is quite the reverse from our behavior, which has too often been indefensible. Just because we treated a mouth or a tooth—presumably to the best of our ability, and with only that promise to the patient—if, months or years later, systemic symptoms arise and the internist requests us to review our work, we too often take it personally, rather resent the imputation and believe that it reflects on our profession. Now, no better plan could be conceived for convincing both the patient and the medical man that something was, after all, really wrong. Something was and still is wrong, and it may or may not be our fault; we presumably have done the best we could in the past, but it will be very decidedly our fault in the very near future, indeed right now, if we do not proceed like the laryngologist to review our histo-pathology and reform our diagnostic and operative procedures.

An important step in the solution of this problem is to be found in a more intimate relation of the dentist to the internist—such association as is common to all specialists with internists in the hospital, where all are convinced of the honesty of the co-operation and where nothing but the truth is acceptable, and motives are not questioned.

WANTED: A SENSE OF HISTO-PATHOLOGY.

Leaving the question of microbic invasion by way of the gingiva, known under the too broad term of pyorrhea alveolaris, to abler hands, the writer attempts again, in this his sixth paper, to center attention on the periapical tissues, because he believes a correct understanding of the histo-pathology of this area to be even more important than technique, again because it will obviously determine future diagnosis and exact technique. The revered Dr. Truman's "Wanted: A Sense of Pathology," as applied to us, went true to the mark. The writer would presume to add, "Wanted: A Sense of Histo-pathology," so that we may relate and correlate these tissues in the normal well enough not to damage them in our attempt to

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relieve abnormal processes. So, while the title of this paper may seem a far cry, from the health of the dental periapical and adjacent tissues to the health of the patient and the status of the profession, they are all so intimately involved that our profession—and we say this in all seriousness—will gradually cease to be a profession if we do not proceed at once to meet and master this question of periapical infection. It has been rather facetiously remarked that the way to prevent periapical infection is never to have it—to practice such perfect mouth hygiene and prophylaxis as never to allow carious invasion of enamel, let alone of dentin and pulp, with consequent necessary pulp extirpation. While our sympathies are with this ideal, cleanliness has not eradicated dental caries as yet, and all we can hope is that it will be about as efficacious in the mouth as the application of the same principle in other microbic diseases. Nor has the dental millennium arrived as yet; in the meantime an occasional pulp becomes infected and exposed. So it is to the normal apical region that we would call your attention.

As far as our present knowledge goes, if there can be differing degrees of relative importance of the six cardinal dental tissues, it lies with those attaching the teeth, *i.e.* the cementum, pericementum and alveolar walls, rather than with the pulp, dentin, or enamel, for it is possible to remove a pulp and leave dentin and enamel in physiologic relation to the jaws, if the nutrition of these attaching tissues has not been attacked in the effort, while lesions arising at the gingiva, such as interstitial gingivitis, are most fatal to all tooth structure and the least under control of all mouth diseases.

CEMENTUM AND PERICEMENTUM.

The following description of the cementum and fibers of the pericementum is paraphrased from many histologists, principally F. B. Noyes ("Dental Histology and Embryology," 1912): Cementum and pericementum attaching the tooth to the alveolar walls are developed and formed according to age and particularly use; as the tooth erupts, there is but one layer of cementum, *i.e.* the primary circumferential lamellæ, laid down against Tomes' granular layer at the expense of the thickness of the future pericementum. This layer contains microscopic fibers, but is otherwise an apparently homogeneous calcified structure, so there can be no known communication from the pulp via the dentinal tubules and the lacunæ and canaliculi to the peridental membrane in the dentin region. Lamina after lamina is added; these are deposited among the fibers of the pericementum attaching the same (by the way, the only means by which they can be attached) by a modified connective tissue cell, the cementoblast, which presides over this deposition and finally becomes inclosed in matrix substance, producing the lacunæ, with their processes, the canaliculi. Of these there are not so many as in subperiosteal bone formation, but the whole procedure is very like it, as Hopewell-Smith ("Pathology and Patho-histology of the Mouth and Teeth") observes, minus the number of penetrating vessels. "The cementum becomes gradually thicker in the middle third and is thickest in the apical third," so that the apex of every adult tooth is completed in vital and growing cementum containing many lacunæ and canaliculi, if not vessels—a much more open structure,

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free to the flow of tissue juices, than that covering the remainder of the root. Noyes says, "From a study of the lamellæ, therefore, it is apparent that the entire root is clothed with successive layers, and that these layers are formed intermittently, but continue to be formed as long as the tooth is in position" And again, "This occurs whether it contains a live pulp or not." "If for any reason the tissues are detached from the surface of the root, they can only be reattached by the formation of a new layer of cementum on the surface of the root, which will embed the surrounding connective tissue fibers." "In order to accomplish this, the tissues must lie in physiologic contact with the surface of the root, and the connective tissue cells must be actively functional." . "In view of its function, therefore, the cementum becomes not the least but the most important of the dental tissues." Age and use control the formation and thickness of the lamellæ, and in a general way the number of layers is an index to age. "If a considerable number of teeth of persons of twenty years were sectioned, the lamellæ counted and the number compared with the number found in teeth extracted from persons of forty, a fairly regular increase in numbers of layers will be noticed and so on for fifty, sixty, seventy, or eighty years." "It is important to remember in connection with this formation of cementum, that teeth move more or less under the influence of natural forces throughout life, and that every slight change in position must be accomplished by the formation of a new layer of cementum to reattach connective tissue fibers in new positions or adjust these to new directions of stress." "Again, it should be noted that wherever special stress is exerted upon a bundle of fibers, the cementum is thick around them." "There is thus continual resorption and repair through life to meet stress and new layers are being constantly added."

THE BLOOD AND LYMPH SUPPLY OF THE TEETH.

The nutrient pulp vessels and their mode of entrance into the tooth is also most important in this connection, it would appear that we have been very decidedly misled by anatomists, both in descriptions and illustrations of the vascular supply of this area. This has been ably corrected by J. Bethune Stein ("A Study of the Maxillæ with Regard to Their Blood and Lymph Supply," *Items of Interest,* September 1908 to March 1909) and I. N. Broomell ("The Genesis of the Blood Supply to the Teeth"—*Items of Interest,* April 1908). Broomell takes up the question from the embryological side, and I would paraphrase his paper as follows: He proves that the theory and illustrations of Constant, so frequently used in text-books, are faulty, saying, "The blood supply to growing teeth, as well as to those fully developed *is not by a single separate arterial twig from the main artery.*" His dissections fail to establish "Constant's idea that the dental papilla, finally the dental pulp, is at any time supplied by the single vessel direct from the artery." Quite the contrary, they show it "coming from above by many minute vessels which arise in the peridental tissue and find their way into the pulp after coming through the wall of the dental follicle." Here it is to be noted and accented that the cementum is formed from the follicular wall as is the pericementum; hence it is significant that the vessels pass through it.

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This will account for the facts developed in the study of root-apices undertaken some time ago by the writer, in which it was established that, while one vessel was larger than the others, there were many found coursing their way through the apical cementum; in many instances they entered at the beginning of the first deposit of cementum and passed down toward the apex at any place from 40 to 90 degrees to the long axis of the tooth, turning into the main canal to follow the lines of a fish-hook, and that some of these vessels are closed by subsequent additions of cementum to the root apex (J. B. Stein, *Items of Interest,* September 1908 to March 1909); but instead of 10 per cent. of apices having this arrangement, as was commonly believed, more nearly 25 per cent. have more than one nutrient vessel which persists, and finally, this whole region is much more vascular and open than we had suspected. These conditions are further proved by the turn at any place from 45 to 90 degrees found in the immediate apex of so many multi-rooted teeth, and we must recall again to our minds that this is all vital cementum and is really built about the vessels. The writer has yet to see radiographs of sufficient accuracy to show these multiple vessel openings, and there are but few which definitely mark the final flexure of the roots. This is to be regretted, but better representation is hardly to be expected, for radiographs at best portray poorly two dimensions, while here we are considering three.

DAMAGE INFLICTED UPON CEMENTUM AND PERICEMENTUM BY OVER-MEDICATION.

In the foregoing description several immensely practical truths are thrust at us having a direct bearing on our treatment of this field. Paramount among these stands the fact of the vitality of the cementum; that the cemental apex where we finish every root-canal operation is not built, in the adult, of lifeless dentin after pulp removal, but if properly treated can be and is left a vital tissue, not unlike subperiosteal bone, with a nutrient circulation on one side at least—a tissue with remarkable powers of repair, which will respond in degree to the demand made upon it. Do we fully realize what this means? From working so long on what might be called the "helpless" tissues—viz, the enamel with no reparative power; the pulp, which if repaired at all, is almost invariably exhausted by the attempt, ending in calcific or some other form of degeneration; and the dentin, of low reparative effort—we have come to believe in and to practice extirpation and devitalization, and then preservation by the saturation of these tissues with strong sterilizing agents, which are too often destructive not only of the tissue but also of its reparative powers. It would appear that we are thoroughly obsessed with this idea of generally preserving things. Here are two tissues, cementum and pericementum, that nature can and will repair if we only give her a fighting chance and do not permanently devitalize and infect them and do violence to nutritive processes in our effort to preserve them. We do not believe that the great natural advantages of these tissues have entered deeply into the consciousness of many dentists, nor into their operative plans, but they have nevertheless been biologic factors, active to our advantage, despite abuse, whether we recognize them or not. That the various medicaments and methods as ap-

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plied to the extirpation and removal of the dental pulp always endanger the periapical area we are assured. That they frequently penetrate more deeply than we realize and produce a minute periapical necrosis of the neighboring bone, denuding the cementum of the peridental fibers, we are also certain; and this often occurs with little pain or response from the tooth, and must not be misunderstood as referring to the gingival necrosis from careless use of arsenic, for it often results from the most careful applications.

Dr. Weston A. Price is engaged in an intensive study of the damage to the attaching tissues of the tooth resulting from too strong medication, and what he has reported to date more than confirms the writer's views heretofore published, that all pulp and canal medication has been too high in oxidizing, destructive, and penetrating power, and the most dangerous of all these is that foe of all connective tissue, arsenic.

Attention has been called to the general vascularity of this region; to the multiple foramina which no operator in approaching a pulp for devitalization can foresee, and which no primary radiograph can foretell.

THE UNTOWARD ACTION OF ARSENIC.

Attention is now called to another anatomical fact which has been neglected, and to which we will refer again, *i.e.* that this union of tooth root to the alveolar walls is a true joint, not in the sense of a full arthrosis, yet allowing a certain amount of motion and sway normal to every tooth, and especially is it a joint in the interposition of a fibrous membrane between bone and cementum, with a vascular embryonal connective tissue, the dental pulp, leading into it. What would we think of an orthopedist who placed arsenic or any other penetrating and oxidizing agent, such as strong formalin, into such a circulation, leading down into a joint, for a few days, and proceeded to forget it? If he had no means of knowing the relative vascularity of the tissue, would he be surprised to find the neighboring bone and membrane destroyed? Yet that has been the attitude of the dentist. The favorite idea of thrombi arising in pulp vessels, preventing arsenical entrance into the general circulation, cannot be fully accepted, for these thrombi are apt to be arsenically supersaturated and in turn affect the other tissue, until the local cells control the invasion or become necrotic in the effort. This is all a matter of absorption and vascularity. The writer has seen, in the past, arsenical salve applied *ad libitum* to chronic old leg ulcers with no ill effect, while minute application in a normally exudating wound on the same leg would play havoc. The type of gangrenous pulp corresponding to the chronic ulcer is just the type which arsenic will rarely devitalize, as every operator knows; while in the other vascular type it is efficacious, and by the same token is much more dangerous.

From the study of an increasing library of radiographs, the histories of which are known, we are convinced that there is a greater proportion showing rarefied apical areas, particularly about good canal fillings, produced in this way by arsenic—often before the filling is placed—then those resulting from liquefaction from after-infection. The significant feature is that this is a true chemical tissue necrosis, which is sometimes subject to primary direct infection by the operator or post-operative infection from neglected septic foramina,

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sometimes by secondary, endogenous infection via the blood stream. But just as often it persists as a bone cavity, occupied by fibrous granulations, and is never infected. Attention will again be directed to these areas, which often mislead into interpretations of areas as infected which are not supported by careful exploratory incisions and the resulting negative culture; but who, from the clinical evidence and radiographs, can decide this matter?

ARTIFICIAL PRODUCTION OF APICAL NECROSIS BY ROOT-CANAL DRUGGING.

The continued application of strong formaldehyd preparations, phenol, cresol, trichloracetic acid, zinc chlorid, and a host of germicidal oxidizing agents in too high percentage, placed too high in the root; the pumping into this space of sodium and potassium, which is most efficient in destroying the organic tissues; the intentional perforation of this area and passage of nascent elements, such as chlorin from ionization of sodium chlorid with a zinc point in the canal—all will, more or less, according to application, produce tissue necrosis, often without infection of this area but with liquefaction of bone and the apical pericemental fibers, denudation of the apical cementum, and necrosis of the apex. The latest thought and practice in surgery, going hand-in-hand with the modern aseptic rather than the older antiseptic operation, and second only to asepsis in importance, is that as few cells be destroyed as possible. The surgeon has a growing regard for every bit of tissue, for he knows that every cell made necrotic is but another nidus where infection may lodge and find just the needed media for sporulation. Even if uninfected, this cell necrosis is an added element and burden of which the phagocytes and reparative processes have to dispose. Billings (in discussing Best's paper on " Pulp Devitalization," *Dental Review,* April 1915) has recently made quite clear the two great factors active in the body diffusion of the products of focal infective areas; they are—First, lowered local resistance in a trauma or crypt adjacent to lymphoid spaces or tissue; the entry of pathogenic organisms; the death of the tissues furnishing not only nutrient media, but, according to the oxygen which is supplied thereby, opportunity for microbic adaptation in these atria. Second, the septic emboli resulting therefrom, finally appearing elsewhere in the body and producing the disease conditions mentioned. A very long time may elapse after blotting out every focal nidus, before, with every known means, the general resistance may be raised to the point of disposing of the products of such general infection.

THREE CHIEF DANGERS OF ROOT-CANAL TREATMENT.

So the three great dangers to the dentist in operating on this area are quite apparent, *i.e.* first, the production of a minute periapical tissue necrosis of which he is not aware; second, infection of that area, which has lost its resistance by his processes; or third, if he succeeds in closing it without infection, the final arrival, by hematogenous convoy, of micro-organisms, often of the non-virulent type, which may lodge thereon, become adapted and raised in virulence, due to the media furnished, and propagate so rapidly as to form a really dangerous infective nidus. In the writer's opinion, at least one-third of the blind periapical abscesses following not only ordinary, but some of the most perfect root-canal

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work, have thus arisen, and they are even more dangerous than the primary infections, because the patient's general resistance must be much lowered to permit this type of endogenous infection; and again, these are types where all medication and treatment accomplish little.

SHORTCOMINGS IN PROCEDURES OF PULP DEVITALIZATION.

The operation for devitalization of a dental pulp, at its best, is not only surgically unique, but as commonly practiced is also a somewhat questionable surgical procedure. So far as the writer knows, it is the only instance where the surgeon proposes to destroy a tissue and then leave it in the body; for we cut off the nutrition of two tissues, dentin and enamel, by destroying, removing, and substituting in the place of the pulp—the nutrient organ—a root-canal filling, which is a foreign body; meanwhile the periapical area of attaching tissue of the tooth—forming a joint allowing a certain amount of motion—is often disturbed in order to accomplish this, with decided increase in the tooth sway; then we plan to leave all this destroyed tissue, with its weakened attachment, to the care of the stress of occlusion, and expect of it full function. It is also on such apices that we frequently aim to place fillings, crowns, and bridges in perfect occlusion; is it any wonder that in attempting to accomplish this operation, or to relieve pain, or prevent infection, we carry our technique and medication too far? In attempting to destroy the pulp and restore the tooth, we destroy both. The tooth, with its many inoperable canals, becomes a dangerous culture tube with all the elements necessary for growth and adaptation of micro-organisms, finally ending in alveolar abscess.

A PLEA FOR MORE RATIONAL METHODS OF PULP DEVITALIZATION.

We would at this point make a strong appeal—(1) for the surgical removal of the dental pulp; (2) for the discontinuance of the use of arsenic, except in unusual cases—then to be applied, not to the pulp, but to some sensitive spot in the dentin, for a short time, so that by slow absorption, only the coronal pulp may be affected; (3) that the apical third of all pulps be removed surgically, as far as possible; (4) that the immediate cemental foramina, containing blood-clot, tissue, detritus, and exudate, consequent upon the operation, be allowed to drain in the presence of mild iodin solutions, iodoform, or a weak formalin solution, which have been pumped into the field and carefully sealed there, away from saliva, by temporary cement stopping; (5) that the foraminal contents be finally removed, working in these solutions. This may appear old-fashioned, but in reality it is the most modern bone surgery, and follows the most approved practice in operations for osteomyelitis, which this diseased area and tooth apex resembles. It has been and is our method in handling comparatively open, freely draining mouth wounds easy of repair; why is it not good practice in this area, which is inaccessible, difficult to drain, and slow to repair? Much has been written of the care which should be exercised to remove all the foraminal content and to prevent the introduction of infection in root-canal operations, and we cannot emphasize too strongly these precautions. Callahan, Rhein, Best, Ottolengui, and others should be highly commended for their

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untiring efforts to improve and standardize this field; no operative effort is too difficult, no period too long, no precaution too minute, which will finally produce an aseptic and mechanically perfect canal operation. Much has also been said of the ways and means to effect a clean operation, and to the mind of the writer there is infinitely more danger of infecting the periapical tissues by forcing through bits of infected dentin, cementum, or shreds of pulp, when the attempt is made to remove immediately every particle of pulp and to seal the apex in the first operation than if we delayed awhile as described in the foregoing, and attempted to sterilize this area before operating. With the rubber dam *in situ* and all instruments sterile —a most necessary precaution—it takes more than five or ten minutes to sterilize any tissue, even if the destructive agents, in strength heretofore mentioned, are used, and we have yet to meet the operator so skilled in pulp diagnosis that he can say from the symptoms how much of the dentin and pulp of any tooth is infected. The safer plan is to proceed as if it were all infected—which we believe it is—and to attempt to control this by applying mild solutions for a prolonged period, before final removal of the ultimate apical tissues; finally, to allow the areas to heal before emplacing the root-canal filling, an artificial substitute for the pulp. It would appear at least that this is good surgical sense.

DIFFICULTIES OF RESTORING TISSUE HEALTH IN APICAL INFECTION.

We have so far only considered the necrotic apex and adjacent tissue, but when this tissue becomes infected after necrosis, or the necrosis in turn is produced by alveolar abscess, it is questionable if the tooth, all things considered, will ever really perform full function, or whether, unless surgically treated, which will weaken its attachment, it will not under occlusal stress always remain somewhat of a menace to health. ("The Responsibilities of the Dentist in Systemic Diseases Arising from Dento-alveolar Abscess, etc.," C. J. Grieves, *Dental Cosmos,* May 1914.) "If the fibers of the peridental membrane which penetrate the cementum be liquefied, and if the cemento-genetic or nutritive cell layer be raised for a period from its surfaces, if the dental pulp be suppurating or gangrenous, passing centrally through the periapical cementum on the one side, and if it be exposed to pus containing pyogenic cocci on the other—with its nutrient supply doubly cut off, cemental necrosis and infection may be a matter of but a few hours; for even if the pus be evacuated and the periapical tissues readjust themselves, they are restored in unattached white fibers, and the nutrient vessels are of course never restored. The pathological picture then becomes that of a bone from which the periosteum has been raised on both sides, with no blood supply from the marrow cavity. In bone, such areas rapidly become necrotic and are finally sequestrated, when new bone is formed; not so the pericemental apex, for it is retained by the remainder of the pericemental membrane attaching the tooth, which may finally functionate perfectly, while holding *in situ* a dead cemental apex." Noyes' ("Dental Histology and Embryology") remarks relative to these types are appropriate: "When bone corpuscles are killed or die, the matrix becomes a foreign body, and is either absorbed or cast out as a sequestrum." "The same conditions are true of ce-

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mentum; for instance, there are many cement corpuscles in the lacunæ in the region of the apex of the root." "If this portion be bathed in pus, the cement corpuscles are killed, and the tissues become saturated with poisonous materials, so that tissue cells cannot lie in contact with it and live." "In order to restore a healthy condition, the necrosed cementum must be removed mechanically until tissue is reached with which cells may lie in physiological contact without injury." Grieves ("Responsibility of the Dentist," etc.): "It is the writer's opinion that the apex thus becomes necrotic in nearly every fistulous and blind dento-alveolar abscess." "This opinion is based on the results of the study of a large number of X-ray films and specimens." "The specimens in section confirm the fact of the death of the pericemental tissue, and there are many in which the abscess sac, so called, does not involve the visible canal opening, but arises off some point below it, particularly in those specimens where it is difficult to locate the entry of the apical vessels." "This opinion is further confirmed in the radiographic films by a few cases of well-treated alveolar abscess resulting in apparently perfectly functioning dental organs which show no reconstruction of periapical bone, the space formerly occupied by the abscess being filled with organized fibrous tissue." "This is the greatest argument against the vitality of the apex." "Resorbed bone areas remaining uncalcified always indicate an irritant or necrobiosis; they are not nature's method of repair elsewhere in the body; why should they be so considered in the alveolus?"

To quote Noyes again ("Dental Histology and Embryology"): "It should always be remembered that the treatment of an abscess is a biological problem, not a matter of drugs, except as they are a means of producing cellular reaction." "That the tissues may be reattached to the surface of a root is both theoretically possible and clinically demonstrable, but for it to occur, biological laws must be observed, and the conditions are very difficult to control with the old method, involving excessive use of strong antiseptics." "It is well to remember that the dentist can never cure a suppurative pocket alongside of a tooth-root, but if the condition can be controlled, the cells of the tissue may form a new layer of cementum reattaching the tissue, and so close the pocket."

ROUTINE CONTROL OF DEVITALIZED TEETH.

Considering our limited knowledge of just how the tissues are adjusted after periapical infection, and of how little any known treatment accomplishes, and with a desire for research in this particular field only equaled by a dread of the consequences to the patient if the operator fails in his full duty, the writer believes that the only honest and safe procedure, if teeth which have abscessed are to be retained at all, is the occasional radiographic study of the field, long after the operation, with the full understanding on the part of the patient that any such tooth is a very doubtful tooth. If it should "go lame" or "feel long" for even a short period, particularly before use in the morning, or become sensitive to heat or pressure from any direction; if the alveolar walls over the apices respond in the least to pressure; if it lacks the normal bone ring in percussion—it should be opened, or the periapical tissues should be ex-

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plored by way of the alveolus, and an attempt made at cultures. Even if these prove negative, if there are systemic symptoms, after having considered well all the probabilities, we should order extraction of the tooth. This statement no doubt will be challenged by those who claim that they can fill every tooth apex and who honestly believe that the perfect root-canal filling is a "cure-all" for these conditions—and the writer would insist that he stands second to none of those who have attempted, by every means at their command, to improve this, the absolutely most important operation which we perform.

BOASTS AND PASTES DANGEROUS FACTORS IN ROOT-CANAL FILLING.

The fact that many root-canals cannot be filled, he would not use as an excuse for failure. These boastful claims that every apex can be sealed are identical with the gradual and harmful transition of the excellent rule "Every tooth possible must be saved" into the dangerous practice "Every tooth can be saved," or the misleading hygienic slogan "A clean tooth never decays," when, as far as the word "clean" has been defined, no tooth is ever really clean. These sweeping generalizations do our profession much harm. No condemnation is too great for those who take advantage of the known fact that certain remedies, nostrums, and pastes, "perpetual disinfectants," erroneously so called, can be placed in the stump of the necrotic pulp, carelessly left in the apical root-third, and may make the patient comfortable for a year or more. This is a most contemptible expedient of the inefficient, and sometimes the efficient but unscrupulous operator who gambles with his patient's immunity. Granting no systemic after-result, the apex becomes an ideal culture tube at body temperature, connected with lymph spaces for daily inoculation, and the tooth is surely doomed. Further, these pastes, which can be pumped anywhere, often contain metallic oxids, which appear in a radiograph like a metal; they rarely set like a cement, hence are not fillings, and are apt to mislead the most skilled diagnostician in reading the radiograph. But the finest root-canal filling can never alone save a tooth apex; it is a very important factor, but only one of the many contributing to a successful operation; for unless the periapical tissues damaged by the lesion, or the dentist's processes in treating it, be resorbed, and the fibers of the pericementum be reattached—in short, the whole area be repaired—mere technique will never produce a healthy tooth. This brings up the whole question of the filling of root-canals, and, since Dr. Callahan has said that there are one hundred and fifty-odd methods now in vogue, the writer does not propose to add another to this list, but would like to propound a question. Where do you terminate your root-canal filling—*at, just to, in,* or *through* the immediate vessel opening?

THE PROBLEM OF COMPLETE PULP EXTIRPATION.

This is said to be a dangerous subject, and what is here introduced must not be misconstrued as an excuse for slovenly methods. That every particle of pulp which it is possible to remove by the finest instrumentation and technique and with no regard for the time consumed, should be removed goes without saying; we are also convinced that the operation should be painful if the apex be vital, and the filling should end *to*

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and *in*, but *never through* the apex, with certain exceptions to be noted later. The rather recent, and what might be termed too officious, surgical procedure in this area is to be deplored—we refer to the practice of intentional perforation, under the broach manipulation, with sodium and potassium—for the simple reason that it is not possible, even with a help of a radiograph, in the majority of adults, to look into a canal and to follow all its ramifications to the ultimate, and then on out intelligently into the pericementum, though it is easily done in the open canals of childhood and adolescence (though not so easily repaired), for the age and development of the patient is here, as elsewhere, of primary importance, and we recall to mind Noyes' remarks quoted as to the normal added cemental lamina as age advances. Some sort of a perforation can always surely be made, a gold wire passed, and radiographs taken—but is this the real vessel opening? Have we not added another chance for damage and infection of the surrounding tissues, and after all left the old one still containing a part of the pulp? And if we succeed in filling this new one, how are we going to fill the original opening we could not find? If there are other vessel openings at angles to the main canal, how are we going to excavate and fill any of these, when we cannot determine their presence by radiograph or sense of touch? Again, what is the idea in perforation, anyway? Presumably, that every particle of pulp tissue be removed. The writer sympathizes with this commendable view, which has been one of the desires of his professional career, and which he is bound to finally accomplish, but there are an increasing number of cases in those studied, where the necropsy will show that all but the smallest apical part has been removed, and of the two evils we should rather stop at that, if the apex can only be left vital; if it be necrotic, apicoectomy, or surgery, will eventually be the only means to accomplish that end. Hence, when it comes to a question of deliberate puncture that all vital pulp be removed, it were better to consume the time in conservation, and to stop just short of it—to remove the pulp *to*, but not *through* the apex, and particularly not to run the risk of infecting this area—and then to allow the cells to resorb and care for the vessels and small tissues left. For, after all, these natural processes are the only means which will care for the damage in the perforation we make, anyway, and this whole region is finally repaired by cell processes and not by our processes. Our duty is but to remove, not destroy; then, following the recent surgical rule, there will be less cell necrosis, less tissue to repair, than in the method of deliberate perforation. Repair in this region depends, as we are again reminded by the quotation from Noyes, upon the fact that the cells must reach and resorb the defective area and lie in physiologic contact with it. A new attachment of tissue can be produced in no other way; this is quite possible concerning the organized clot and pulp shreds mentioned as lying just at the immediate foraminal opening, but this condition must be sharply differentiated from tangible pulp shreds negligently left deep in the apical third. Even if the pulp be all removed, the failure of the filling to reach the immediate foraminal opening will create a tube dangerously full of exudate—all of these

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conditions existing far away from any chance of physiologic cell function or normal contact.

CRITICISM OF THE METHOD OF ALLOWING GUTTA-PERCHA POINTS TO PROTRUDE BEYOND THE APEX.

The also rather recent process of protruding pink gutta-percha cones, which have been sterilized and softened in chloroform, through these intentional perforations, we do not believe to be necessary, nor will it eventually stand criticism as good bone surgery, for the following reasons: First, we are invading a joint, as has been shown, allowing sway of the tooth, proportionate to the destruction of the peridental fibers; this motion, present in the normal teeth, is greater in teeth where the periapical foundation has been destroyed to any degree, and these are the cases needing most this operation. Some operators claim to protrude the filling in all cases, others only when there exist resorbed bone areas. It has been observed where there is much backward pressure from healthy tissue, that the soft chloropercha assumes "mushroom shape" on the apex, or is "encapsulated" at the end of the root. If there exist a periapical pocket or rarefied area, it will push on to the outer wall, wherever that may be, of the area, and double up in "pig-tail shape." The point we desire to make quite clear is that these extensions all move as the tooth sways in mastication, and while there exist radiographs showing bone apparently built up near the projecting filling, closer inspection will disclose enough open area about the gutta-percha to condemn adjacent apices which have not been so filled in the same mouth. Second the writer has opened into such areas which apparently on the best of radiographic evidence were filled with secondary bone, only to find no bone, but a mass of fibrous new granulations. A rarefied area about an apex may mean many things, complete liquefaction of bone matrix under repair, for instance, which should not be disturbed; there are many dense areas where the bone is quite necrotic, just as calcifying tissue may appear as bone; or again, the interstitial bone may be completely riddled with little granulations showing on the film. Thus, radiographic testimony is only of value where the picture is repeated at the same angle. Quite unintentionally, large areas may be masked by changing the relation of the tube to the incidence of the root. It would be interesting if those claiming new bone could make a few harmless exploratory incisions and take cultures in these regions. Third, it has been said that bone will always build about such sterile gutta-percha fillings, and this, together with the assurance of a well-filled root, is the reason given for making such fillings. There is radiographic proof that such is the case, if the foreign body is at rest, but never when the body is moving, as a tooth. There are many films showing bits of root, gold, amalgam, gutta-percha, etc., perfectly encysted, but all of these were not involved in occlusion, nor did the roots project into the mouth. Bullets, pins, needles, fishhooks, etc., are often lost in and cared for by the tissue. Metal plates and wires are embedded in bone surgery, with good results, but the parts are invariably kept at rest. The opinion of the laryngologist on the advisability of such gutta-percha protrusions, which might approach and finally, owing to re-

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sorption, perforate the antral floor in the upper molar and bicuspid regions, might also be of interest.

This paper is an argument for the preservation and not the destruction of the periapical tissues. It is hoped that operators will not universally adopt this method, when they would not permit the slightest protrusion of the same pink gutta-percha into the gingiva. The general practice of this method will just as surely produce areas of lowered local resistance, open to any infection, as will the diseased root-apex which it was aimed to relieve. Why not allow the giant cells, leucocytes, and phagocytes, and all the tissues presiding over repair, to attack tissue which, even if infected, it is their province to resorb and rebuild, instead of introducing a moving foreign body? The perforation of this region with a projecting filling is only permissible, we believe, in chronic alveolar abscess, to be followed immediately by curetment; or in cases where an immediate apicoectomy is planned. It is simply inconceivable as routine practice and will reflect on our methods in the minds of all pathologists.

REPARATIVE POWERS OF THE PERIAPICAL CEMENTUM.

In conclusion we would emphasize the reparative powers of the periapical cementum, adjacent bone, and particularly the peridental membrane. Let us once more for emphasis recall Noyes' statement that laminæ are normally added to the apex increasingly throughout life; that when stress occurs, further hyperplasia of cementum may normally occur, and these deposits are just as usual on pulpless as on vital teeth, and this process is in no sense an hypercementosis nor an exostosis, unless exaggerated. The tooth in occlusion which has lost the fibers of the gingival third from pyorrhea is typical; increased and unusual stress, provided infection has not occurred, invariably induces these deposits at the apex, impinging on the entering pulp vessels, causing frequently calcific degeneration, pulp stones and such osteodentinal deposits as to almost close the apical third of the canal. The pulps of abraded teeth are likewise affected, not only at the coronal but the apical portion with cemental hyperplasia at the apex, and it would appear as if hypercementosis was but a pathological exaggeration of nature's reparative effort, and that it is not so easy to distinguish between normal repair and hypercementosis as was formerly believed. After all, these apical cemental deposits occur with such regularity as to be the normal biological procedure for closing and guarding this area against infection, as the patient becomes older and the teeth are subject to greater use and more open to pulp exposure. It would also appear that this might be a supplemental function to the reparative process of the dental pulp supposedly lost to us through civilized food habits and lack of use. In the collection of specimens for the study of the success or failure of root operations, several important factors heretofore noted must be kept in mind; notably age and use, recalling the increasing apical deposits after forty. It might be comparatively easy to do careless operating on this field at that period and yet succeed, because of the closure of the vessels to such fine caliber as to make pulp nutrition a mystery. This fact undoubtedly accounts for successful root-canal operations in abraded and pyorrheal teeth, where the root-canal filling rarely reaches the middle third.

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The operator boasts of the success of his method and "has never had a failure;" meanwhile the root-apex and the apical third was filled by calcific degeneration and not by him. In fact, if sections of adult teeth be carefully examined, these extra laminæ are almost universal, and are well-defined and easily found; indeed, there is written in the cementum of every tooth, as in the bark of a tree, the record of every period of stress, and even infection, if not virulent, is always marked there by absorption and repair, often invading the dentin. This secondary or adventitious cementum is more open in structure, with a greater number of lacunæ and canaliculi, so it is possible to say, unless the process has been too active, with secondary absorption, just where repair has occurred. This will answer the question naturally arising from the following statement. After collecting and studying specimens for some time, the writer is convinced that the foramina of every pulpless tooth, if not negligently left open or infected, but filled in or almost to the immediate opening, are after all closed and covered by a deposit of fibrous tissue, which later is often converted into extra lamellæ of cementum. The proof of this contention lies in the fact just remarked, that we can readily distinguish between the older and secondary cementum, and that in some instances it completely closes, and is deposited down into all foramina. It is to be thoroughly understood that these are decidedly not hyperplastic deposits nor hypercementosis, as it is commonly known. It is also quite evident that visible absorption of the cemental apex occurs in many pulpless uninfected teeth; this is proved by specimens where the foramina were known to be impassable, and which were filled and some time afterward presented the root-canal filling apparently projecting. Closer observation, however, develops the fact that the whole cemental zone has been visibly reduced in some instances down to the dentin. These were not pus cases, nor of the rough type of lacunæ cut in the presence of infection. There can be but little doubt that this resorption occurs, in a degree, in every pulpless tooth the apex of which has been carefully treated and filled. It also is to be noted even in some infected apical areas, and, as has been repeatedly stated, if it can be carried to the point where the cementoblasts lie in physiologic contact, the secondary deposits of cementum, described as reattaching the fibers of the peridental membrane, are not uncommon. If the apex be infected or soaked with strong chemicals or arsenic, the attempted resorption of cementum, which is a minute process, is reflected in the surrounding bone, if that has not already been involved, and the periapical bone areas will then appear as gradually enlarging, by a series of radiographs. The growing rarefied bone area is thus the reflection of a vigorous attempt on the part of the local cells to be rid of the irritating cemental apex, and is always a danger signal, bone being more susceptible to resorptive processes than tooth root.

CONCLUSION.

This idea of repair will explain many phenomena lately developed from comparative radiographic study. For instance, in a recent paper (E. D. Best, "Responsibility of the Dentist in the Event of Pulpless Teeth," Proceedings Second District Society, April 1915), Best reports that in a study of 288 pulp-

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less teeth, "The mechanically defective operations which showed rarefied areas were 177" and "The mechanically defective operations which did not show rarefied areas were 41"—or nearly 25 per cent. Hence, if periapical bone resorption means anything—with no attempt to belittle the value of the most thorough root-canal technique, as these facts can never be used as an excuse for carelessness—we can reach no other conclusion but that some process other than the dentist's has taken care of these teeth. Many of them, we believe, contain the remaining stumps of pulps, vitally nourished and still existing, and in others it is possible that these stumps become calcified. It is almost certain that none of these had been virulently infected, and that few had been devitalized with arsenic. It is also quite evident that the vitality existing in the periapical region protected them, even if the dentist did not. What is the percentage of the buccal roots of upper molars, or anterior roots of lower molars, or of delta-foraminal canal openings in all types of teeth, which have been filled to the immediate vessel entrance, and what has in the past taken care of these unfilled roots? The only answer we can now offer is that, barring infection, and often in its presence, these same reparative processes did better than the dentist, and that in just as many other cases they failed utterly, with resultant virulent blind and fistulous abscesses, accompanied occasionally by systemic diseases —so it would be foolhardy to depend upon this chance protection.

The writer presents this paper with a too evident knowledge of its defects; it is but a proclamation of faith, so to speak, announced too early, needing much confirmation by research, which it is hoped can be made. The situation is so serious that every member of a study club should immediately not only begin the collection of radiographic data and clinical histories, particularly of teeth known in regard to age and use, but should study the results of his work in ground and decalcified sections out of the mouth; and while he should look to his failures, he must also see the results in his successful cases. This means the extraction of some functional teeth, but how little that matters when we think of the numbers which are lost every day that might be saved by research in comparatively few known cases. A few lives and much illness and suffering might also be saved. Such co-operation with a research directed to assemble the data as to histories, cultures, materials, medication, methods and technique might soon enable us to make just one fairly accurate mouth diagnosis.

DISCUSSION.

Dr. JOHN B. WEST, Elmira. Dr. Grieves has presented a paper which is in accord with the latest research work on apical infections, and one that is especially opportune at this time, when the medical profession is beginning to realize that many grave systemic conditions are secondary to local focal infections. We are well aware that Rhein, Ottolengui, Callahan, Best, and others have

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been doing pioneer work in this field for some time, but it is a subject of such importance to our profession that the truth offered by Dr. Grieves cannot be presented too often or too forcibly.

We believe the histo-pathology of the periapical tissues as presented by Dr. Grieves is correct, but we would like to emphasize the fact that, where pathogenic micro-organisms invade the periapical tissues either through the root-canal or by hematogenesis, the pericementum in contact with the apex becomes gangrenous, and the vitality of the apical cementum is destroyed.

From clinical observation and from a study of a number of roentgenograms of teeth with blind dento-alveolar abscesses, we believe the dental treatments of these conditions in the past to have been a failure.

We are convinced that it is impossible in blind dento-alveolar abscess or in chronic alveolar abscess, in fact, in any condition where pus has formed in the apical space, to cause a revitalizing of the periapical cementum by the use of drugs. As Dr. Grieves states, perhaps the most promising therapeutic treatment yet advanced is sterilizing of the periapical tissues by the ionization of zinc salts.

Nevertheless, the pericementum is not in physiological contact with the cementum, whenever pus has formed at the apical end of a root. Invariably roentgenograms of the periapical tissues show a rarefied area of bone surrounding the apex of the root. We believe that the resisting power of these tissues is lowered, and whenever the opsonic index drops below normal, micro-organisms reach this area of lowered resistance by hematogenesis, and these old infections light up.

In this connection we wish to emphasize the bacteria-holding power of the crypts of the cementum where the fibers of the peridental membrane were attached. The apical end of the root being pitted, we can see no difference, pathologically, between the bacteria-holding power of the apical cementum and the cementum near the gingival margin in a pyorrhea pocket.

We agree absolutely with Dr. Grieves in his position on this subject. Whenever patients who are suffering from rheumatoid arthritis, arthritis deformans, endocarditis, amylaceous lesions of the kidney, and other diseases that have been traced to a local focus have been referred to us by the internist for a search for foci of infection in our field, we believe that when the roentgenogram shows rarefied bone areas and fistulas of chronic alveolar abscess are demonstrated clinically, our only course is to blot out those areas of lowered resistance either by apicoectomy or extraction. If we do not proceed in this manner, in the light of the research work that has been done by Hartzell, Henrici, Price, our essayist, and others, we are taking a chance on the patient's immunity which is not, in our opinion, justifiable.

Dr. Grieves mentioned three dangers which confront the dentist in operating on these tissues: (1) "Producing periapical tissue necrosis;" (2) "infecting that area which has lost its resistance by our processes;" (3) "if we succeed in closing the root-canal without infection, the arrival by hematogenesis of micro-organisms of low virulence." To our mind these three statements sum up this problem in a nutshell, and we wish their importance could be thoroughly impressed on every dental practitioner.

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While there are many men in our profession today who realize the importance to dentistry of systemic infections through the dental path, and who are doing root-canal work in accord with modern surgical practice, still, from our literature and from discussions of papers at meetings, one cannot help but gain the impression that the ordinary root-canal operation will not stand the scrutiny of aseptic surgical practice.

Let us say right here that in our belief Dr. Grieves has done the profession a great service in sounding a note of warning regarding the common use of arsenic in root-canals, as we thoroughly believe that his position regarding the use of arsenic is well taken. Not only is arsenic used freely, but various mummifying pastes are used unscrupuously in too many cases.

The realization of the truth of the essayist's three statements and the carrying out of practices consistent therewith from a histo-pathological standpoint, will in our opinion fix the future status of the dental profession.

Dr. M. L. RHEIN, New York. The paper of Dr. Grieves requires very careful study in order that his position be properly understood. The time allotted will not permit an exhaustive expression of opinion in regard to some of the points under discussion.

We have no difference of opinion as to the serious effect of an infective nidus in the periapical area. We are agreed upon the fact that such infections are liable to produce the most serious disturbances of health, and even the early death of the individual.

The essayist mourns the fact that the dental profession has been unable to present a technique of surgical therapy that will meet the demands of the internist. Many of us in the city of New York believe that we have fulfilled all the requirements of that demand. What is this demand? It should be, that all material that is liable to produce pabulum for micro-organisms be entirely removed; that every trace of pathogenic condition should be thoroughly eradicated, and the parts left, not only in a condition free from infection, but so that there will be no trace of nutrient media left by means of which secondary infection may take place. In short, the dentist ought to be able to say that as far as the periapical region of a root is concerned, reinfection is impossible.

The essayist very justly criticizes the use of arsenous oxid, formaldehyd preparations, and many other powerful irritants which are liable to keep up a constant destructive irritation in the periapical region. In this category of condemnation he has included the scientific technique of surgical therapy which I have promulgated among the profession.

I am pleased to have Dr. Grieves openly state his point of criticism, because it should be the simplest matter to efface, if anyone desires to approach the subject with an unbiased mind.

The essayist constantly uses the expressions "necrotic tissue" and "necrosis of the cementum and the periapical area" in a manner that seems to be entirely inconsistent with an up-to-date pathologic understanding.

It is a great pleasure to agree with his objection to the use of arsenous oxid on account of the possibility of its producing a serious alveolar necrosis. No condemnation of this agent, for this purpose, can be made too strong. On the other hand, when referring to rarefication of the alveolar tissues, it is a

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common error, especially among roentgenologists, to speak of necrosis of the alveolar structure as found in the roentgenograms which they furnish with an opinion. Although there is a destruction of the alveolar structure going on in this infected area, which is evidenced by the loss of the osseous substance, this should not be spoken of as a true necrosis, where a distinct line of limitation is set up and a sequestrum is formed. The alveolar structure, on account of the great number of air-spaces intermixed with the bone, is very readily destroyed without a true necrosis occurring. We do, in serious cases, obtain a real necrosis of the jaw, and in all such conditions the symptoms are of such a nature that a correct diagnosis is very easily made.

The reason of the difference of opinion between Dr. Grieves and myself is entirely due to the fact that Dr. Grieves has only a theoretical and hypothetical knowledge of the technique of the surgery of the operation as taught by me. For some unaccountable reason he does not appear able to comprehend thoroughly what this technique means, because it does not in any sense violate any of the well-known histological principles on which he places justly so much importance. I thoroughly agree in all he says about preserving in a normal manner the vitality of the cementum and pericementum of the root. This vitality is in no manner concerned with the contents of the root-canal or any other of its divisions or ramifications of points of entrance into the root. It depends entirely upon retaining a normal circulation in the pericemental region, from which, he himself has said, this nutrition arises and on which it depends. On the contrary, the kind of imperfect root-canal technique which he advocates, in which the different foramina are not opened to their periapical aspect, and in which a filling is introduced, perfect or imperfect, but which leaves some final portion of living matter in the ends of the root-canals, in the majority of instances tends to produce the most severe inflammatory action of the cementum and pericementum of the root.

While it is true that with age slight thickening of the cementum takes place, just as a diminution in the caliber of the root-canal occurs, it does not follow that the picture of cementosis which the essayist has drawn gives us an idea of normal cementum in advanced age. The conditions that he has shown are all pathologic and not normal, and one of the means of inducing this is the inflammatory action of a small amount of living matter left at the end of a root-canal, which, in many instances, retains its vitality.

It has been my good fortune to have many operators complain to me of the fact that after they had completed what they considered a most satisfactory removal of the pulp tissue in a tooth which had shown no sign of pericementitis or pyorrheal inflammation, there has followed an acute pericementitis with loosening of the tooth and more or less exudation at the gingival border. This is no uncommon clinical picture, although it may show itself in many varied phases. It is a fact, however, that if the different canals of such a tooth are explored clear through into the periapical area, this pericementitis with its loosening of the root, exudate, etc., will all at once subside, and the parts will return to a normal condition. This is a clear clinical demonstration of the fact that the loosening of the root

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and all the other symptoms of pericementitis were due to the inflammation set up by the remnants of living pulp tissue. In what manner the essayist has argued to himself that reaming out the canals through the foraminal entrances can interfere with preserving the life of the cementum is beyond my perception.

The other important point of objection raised by the essayist is directed against permitting the root-filling to pass through the foramen, and also against the possible effect of sodium and potassium or ionic medication on the periapical tissue. The theory of treatment of infected periapical areas must be based entirely on correct and well acknowledged surgical principles. These consist in the entire obliteration of the diseased area. In order to accomplish this, the intelligent surgeon avoids the pitfall of a great many specialists, that is, too much conservatism. It is essential that an area of healthy tissue be removed at the same time in order to be sure that no diseased tissue is left behind. This is precisely what sodium and potassium and ionic medication do when they are properly used. The essayist is in the greatest error when he speaks of the use of sodium and potassium leaving necrotic areas behind. This is a chemical impossibility, unless the use of this agent is terribly and unwarrantably abused. Sodium and potassium is never intelligently used except in very small quantities. A given quantity of this material unites with a given quantity of organic tissue. This union is accomplished with so much intensity that, when it is completed, both parties to the union are entirely effaced, and the leaving behind of necrotic remnants is impossible. Ionism, when used properly, acts in the same way; that is to say, its escharotic action is self-limiting. This is in contra-distinction to that of formaldehyd and kindred preparations; whatever remnants remain behind are practically inert and are most readily absorbed. The force of all destructive agents in the periapical area is directed to the point of least resistance, the alveolar structure. The great resisting power of the pericementum amply protects the cementum from injuries in this manner.

The essayist's strictures against immediate root-canal filling are well justified, as it is impossible to form any correct idea of how much of the root-canal has been cleansed until correct roentgenograms have been studied, after the first operation has been completed. While it is admitted that a good roentgenogram cannot be easily made the sole basis of diagnosis, yet the essayist's strictures against the value of roentgenograms are not well chosen. For ordinary work, frequently any kind of a picture will do, but when it comes to a careful discrimination and study of the irregularities of root-canals, then it is frequently necessary that the picture be taken at different angles and under different conditions, and, what is of the greatest importance, that it be focused to the very finest point. This focusing can only be done with a very low amperage and necessitates an exposure of at least twenty seconds, if such detail is desired as will permit the field to be effectively studied. If sodium and potassium be used for the purpose of reaching the end of the canal, no fear need be had in regard to infective matter being forced through the foramina, nor should any drugs of any kind be left in the canals, as they will but

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interfere effectually with a correct understanding of the condition of the canals. It is freely admitted that in a certain percentage of cases it is not possible to get to all of the foraminal ends, but this percentage is very small, and there should be no compromise with such teeth. The only safety for the patient rests in the immediate extraction of teeth which cannot be handled in such a way that the operator can prove that the foraminal exits have been sealed. Issue is taken with the statement that the various ramifications and foramina are not filled by this method. I will show upon the screen a picture of an upper molar which is not an extraordinary one, showing clearly a number of different foramina. In looking at this image, you can judge of the possibility of sealing different foramina. In reference to the protrusion of the root-filling through the foramina, it may be of interest to the essayist to learn that there is no intention to have the filling material do more than encapsulate the end of the root with gutta-percha. Gutta-percha is one of the most compatible materials that can be placed alongside the soft tissues, and it is well known that, if it is used in this way with every regard to thorough asepsis, there is practically no reaction from the tissues.

The therapeutic principle that is desired, and that is imperatively necessary, is that no place of possible habitation of wandering micro-organisms should be left in the periapical area when the operation is concluded. This object can never be attained unless the periapical end of the foramen is sealed. If the root-filling comes within the minutest fraction of sealing this foramen on the periapical aspect, it will leave this microscopic crater as a place of habitation for micro-organisms. It is on this account that osseous regeneration of the alveolar structure has never been attained by the essayist.

It is not the intent of the operator to force the gutta-percha through to any great distance, but in the act of attempting encapsulation, it very frequently occurs that the gutta-percha is forced through to an appreciable extent. This will produce some trauma, the same as follows ordinary surgical operations, but it soon passes away. It does not do what the essayist claims it does, viz, interfere with regeneration of bone tissue. On the contrary, the limited motion which takes place in this joint in no way imperils the condition of the gutta-percha or the normality of the structure in which it is placed.

I will show upon the screen a roentgenogram of a root-canal filling which I introduced in this way over twenty-five years ago. I have three different views of this same case, and each of them shows the protruding gutta-percha and alveolar structure that is absolutely normal, according to my interpretation of normal tissue, and I should say in justice to myself that this opinion is coincided with by many roentgenologists of repute of whom I have asked an opinion, since the essayist claims that this did not show normal alveolar tissue. I will also show you a picture of regenerated alveolar structure which was taken a year and nine months after the root was filled, and which the essayist claims represents fibrous tissue and not osseous structure. Only a few days ago I showed these pictures to that eminent roentgenologist, Dr. Caldwell, and his associate. They unhesitatingly stated that there could be no question of the new tissue not being bone. They could

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not understand how any roentgenologist, after observing the picture, could arrive at any other opinion.

It would be very interesting, if time permitted, to trace the essayist's story step after step and show that the technique which I have promulgated in no way interferes with the health of the cementum. When the cementum is once attacked by necrosis, then I agree with the essayist, as I have always said that our only recourse lies in apicoectomy. Unfortunately, however, many operators have been accustomed to make a diagnosis of impaired cementum when it does not exist. The diseased area lies in the alveolar structure, and as a rule never interferes with the normality of the cementum, which is amply protected by the pericementum.

The essayist has spoken with some feeling about the lack of a dental sense of histo-pathology. I thoroughly sympathize with this statement, only it would be better expressed by saying that dentistry suffers from the lack of educating its students in the ability to make a proper diagnosis. The method of attempting to educate dentists in regard to localized pathology—which cannot be dissociated from any part of the body—without their being educated in each and every disease that can attack the human body, is the sole cause of this lack of a sense of pathology, which is due primarily to the fact that it is impossible for them to learn to make a proper diagnosis as long as they are ignorant of what may happen to other portions of the body. The practical fact in regard to this important subject is that the essayist has presented to us a theory in which he has offered no evidence to disprove the clinical and radiographic evidence which I have produced for some time to substantiate the claim that the technique which I have introduced to the profession fulfils the requirements of leaving the parts not only in a healthy condition, but so that reinfection cannot take place.

Dr. R. Ottolengui, New York. Dr. Grieves has given us a very pessimistic picture of this subject, and I feel that you would all go away feeling very sad if you do not see a picture of the same subject drawn by an optimist.

I agree with everything the essayist has said about arsenic. As far as I can remember, I believe I have not used arsenic more than two or three times in the last eight or nine years, and I think I have regretted it—*two or three times.*

I also believe that the essayist sounds a very timely note of warning when he tells us that many medicaments are used in too great strength. A very prominent surgeon said to me once, "I cannot understand the courage you dentists have in using everything just as it comes out of the bottle. You want everything full strength, while we use everything in dilutions."

The essayist has raised before us the bugbear that, while many of us have been trying to clean the canal to the end of the foramen, there really are many foramina, multiple openings at the ends of these roots, and he questions our ability to fill them. We do not need to worry about these multiple openings at all. There is probably one main foramen, and all the other openings are merely channels for the entrance of nutrient vessels, and if we remove a healthy pulp, there is not the slightest doubt to my mind that these channels are still filled with nutrient vessels carrying blood, closing up at the pulpal ends, healing, and terminating in a healthy

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condition; so we need not worry, provided *we start with a live, healthy pulp.*

When dealing with infected conditions we have a different picture, and then we must determine what to do. Dr. Grieves has shown us a lot of danger signals and has not pointed out any remedy, but I am going to try to show you the optimistic side and point out that there is a remedy, and that all we have to do is simply to be a little more careful in our diagnosis and a little more capable in our technique.

The particular question I want to try to answer is, "Shall we carry our canal filling *to* or *through* the apical foramen?" I think it makes a difference what the conditions are. For instance, if we remove an uninfected living pulp, there is no reason to believe that the pericementum is other than vital and healthy; consequently I can see no reason why we should protrude broaches, wires, or gutta-percha or anything else through the apex of the tooth. I therefore believe that every precaution should be used to fill such a tooth to the foramen and no farther.

But in the presence of infection the problem is quite different. Then is it that we must remember the possibility of the so-called multiple foramina, and the further possibility that the nutrient vessels which should occupy them may have died. But I do not believe that these microscopic vessels will die, so long as the pericementum remains in a state of health at the point where these vessels emerge from the pericementum; or to state it otherwise, we need not worry about multiple foramina so long as they are outwardly covered by healthy pericementum. If, however, the pericementum be dead, so that these multiple foramina are uncovered, then of course their contents can no longer be living, and must be counted as infected or at least as infectious tissue. It is true, as Dr. Grieves has said, that the radiograph does not positively inform us of the existence and the whereabouts of these multiple foramina, but our knowledge of tooth anatomy quite sufficiently guides us in our choice of treatment. Usually these vessel foramina enter quite near the true foramen, though occasionally one or more may be seen along the side. In deciding upon treatment, then, we must study the radiograph carefully, and also consider the history of the case. When only the extreme apex of a root is involved in the rarefaction disclosed by the X-ray, then we are reasonably safe in resorting to thorough sterilization of the canal with Schreier's sodium-potassium, which will at the same time destroy and sterilize the contents of the extra foramina.

This accomplished, the canal must be filled with chloro-percha sufficiently fluid to be forced into the extra foramina and through the major foramen, out of which it should exude so as to flow over and around any part of the apex which is denuded of pericementum, thus not only coating the root-end with an aseptic non-irritant shield, but at the same time covering over the outer openings of these extra foramina. If, however, the radiograph shows that an excessive portion of the apex is probably denuded of pericementum, then we must decide between the possible cure by ionization and the radical operation of apicoectomy. May I show you just a few cases illustrating these various modes of treatment?

Case 1. **The patient was a man, age about thirty. He presented with the lingual enamel split by a blow from an otherwise**

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sound central incisor. The tooth was very sensitive along the surface of the fracture, and was temporarily covered with cement. Two days later he presented with the pulp pericemental tissue. Consequently the root-filling should extend through but not beyond the foramen. Fig. 2 shows the canal filled in this manner.

FIG. 1.

FIG. 2.

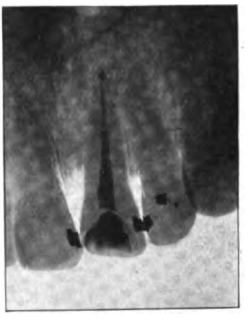

FIG. 3.

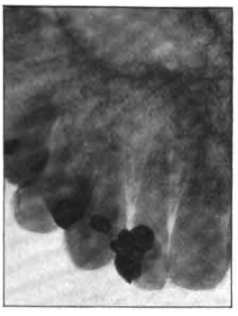

FIG. 4.

FIG. 5.

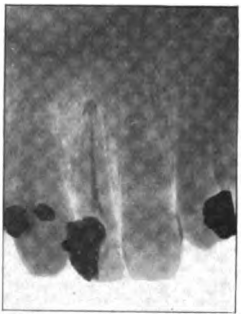

FIG. 6.

FIG. 7.

dead and an acute alveolar abscess. Fig. 1 shows this tooth with a wire in the canal after pulp removal. The infection having been of such short duration, there had not been time for any great destruction of the

Case 2. The patient was a man of about forty-five. He exhibited a chronic alveolar abscess over the upper lateral incisor. The radiograph (see Fig. 3) discloses the fact that the pericementum has been lifted away

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or destroyed from the apex of the root. Fig. 4 shows the tooth with a wire inserted to the end of the canal. Fig. 5 shows the canal filled with an overflow of chloro-percha perfectly encapsulating the denuded end of the root.

Case 3. A young man, age seventeen, presented with a chronic alveolar abscess over the lateral incisor, with imperfect root-filling, the end of the root extending to such a distance into the rarefied area that nothing but a radical operation promised a cure. (Fig. 6.)

FIG. 8.

FIG. 9.

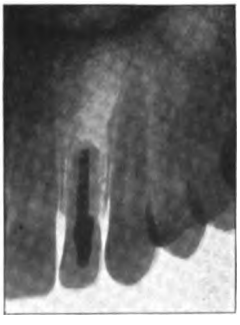

Fig. 7 shows the condition after correct canal filling, root amputation, and extensive curetment. This abscessed area permitted probes to reach the soft tissues of the palate, and its extent may be gaged by the fact that at the first dressing nine inches of quarter-inch iodoform dressing were used. This case necessarily healed very slowly, and Fig. 8 shows the condition ten months after the operation, at which time all dressings were abandoned. Fig. 9 shows the condition eighteen months after the operation; the bone is seen to be regenerating nicely.

Dr. Grieves has raised the point that bone will not form about gutta-percha. Those who show abscessed or other infectious conditions about gutta-percha forced through root-canals must be prepared to prove that the gutta-percha was sterile when introduced and that the surrounding tissues were free from infection at the time, before they can es-

FIG. 10.

FIG. 11.

tablish the fact that the accidental protrusion of gutta-percha is dangerous. That absolutely sterile gutta-percha will be tolerated by the alveolar tissue, and that repair and even rebuilding of bone about such gutta-percha may be expected is abundantly proved by the following radiographs:

Case 4. Fig. 10 shows the condition about a replanted tooth as disclosed by a radio-

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graph taken four years after the writer had replaced the tooth, for which reason he is in the position to state positively that the gutta-percha was sterile when used as a canal filling, and that it was introduced in an aseptic manner. Note that the root has been resorbed, and that new alveolar bone has

FIG. 12.

FIG. 13.

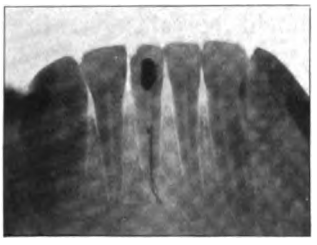

FIG. 14.

formed about the gutta-percha filling. Fig. 11 is a radiograph taken four months later, when the tooth was loosened by biting on a hard substance, and so firmly was the gutta-percha embedded in the bone that we note the fracture of the gutta-percha.

Case 5. The patient, a woman of about twenty-five years, had suffered for three years with a mysterious swelling of the chin. The radiograph (see Fig. 12) disclosed a non-fistulous abscess on a lower lateral incisor. After root-canal cleansing, ionization was used twice, and the canal was filled as shown in Fig. 13, where we see that the gutta-percha cone was accidentally protruded to a considerable extent beyond the apex. Nevertheless a radiograph (see Fig. 14) taken fourteen months later shows that the previously diseased area has been completely filled in with new bone.

I believe Dr. Grieves asked if anyone had ever protruded gutta-percha into the tissues, expecting the tissues to tolerate it. Some years ago I was visiting a prominent surgeon who was very much distressed because he had had a failure in his hospital, where a man had suffered from fracture of the femur, which had been neglected until necrosis had destroyed one-half inch of the bone. You can easily realize that, with a half-inch of the femur missing, a man's leg would be useless unless the bone was replaced. He had followed the procedure of making a ferrule from the femur of an ox, dissecting down the two ends of the bone and ligating the two ends of the man's femur into this ferrule of ox bone. This had been left *in situ* for several months, and when it was taken out it was found that there had been no growth of the bone through the ferrule. I said to him, "I believe you can follow a dental precedent here. I believe, if you make a ferrule of base-plate gutta-percha, and have the ferrule sterilized and placed over the two ends of the bone, having softened it so that it can be spread over the ends and made to fit tightly around the bone, new bone will grow through the gutta-percha ferrule." He did this, and four or five months afterward, when the gutta-percha was removed, the bone had united through the base-plate gutta-percha ferrule.

Dr. GRIEVES (closing the discus-

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sion).* I wish first to thank Dr. West for his remarks, and to take up the slide which I requested Dr. Ottolengui to show us. You will recall that the tooth, extracted and filled with gutta-percha, with its apex trimmed as usual, had been successfully implanted for some time. The series of excellent slides shows a progressive resorption of this root, as is observed in all implanted teeth, which finally reached clear down to the gutta-percha root-canal filling, leaving it in perfect contact with the alveolar bone. It is well recognized that all implanted teeth are attached by ankylosis, and do not normally sway as do those with normal peridental membrane, and that the deposit of alveolar bone in the resorptive bays cut in the roots holds the tooth rigid; it is also known, from comparative anatomy, that this very rigidity finally accomplishes the destruction of every implanted tooth, because in the freely moving mandibular articulation of all the mammalia there is no known instance of the occurrence of this type of "bone of attachment" which is found in the lower orders. The point I wish to make clear is that this gutta-percha filling was at first firmly fixed in the alveolus by the very process of resorption and deposit, the reparative process in a tissue, the cementum, with which the cells can lie in physiologic contact, and it was not, as I said in the paper, swaying as a normal mammalian tooth attached by peridental membrane should.

The last slide more than proves my contention, because as soon as enough of the root was absorbed to allow motion, and the tooth began to tilt, the gutta-percha root-filling, firmly held in the bone, fractured. In the last slide you noted the large area about the portion with the gutta-percha apparently protruding, which moved with the tooth, and particularly good bone about that which did not move. I am deeply obliged to Dr. Ottolengui for bringing this slide, and I call your attention to his statement that he intentionally perforates and projects his filling only in abscess cases, or where there has been destruction of periapical tissue, while Dr. Rhein claims to perforate and protrude his filling in every case.

Relative to Dr. Rhein's discussion, much might be said were there time, and I consider that all his contentions have been answered in my paper. In his boisterous manner he assumes that I have some personal bias, and that I am attacking him, while my whole plea was for a greater regard for the vitality of the adjacent apical tissues, as those will recognize who listened intelligently and saw the slides. I have ample proof in my own practice, where I have been doing ionization for over a year, of the destruction of the membranes and absorption of the alveolar process by this method, also of the bad effects of pumping sodium and potassium through the apex. The latter is a most valuable remedy if confined to the tooth, but in case of perforation it is forced out into the tissues, and while it may combine chemically with alveolar tissue, as Dr. Rhein says, it also destroys it. Therefore I believe in its use in the tooth if not applied too radically, but not when it is forced out into the tissues, as I believe Dr. Rhein applies it. I have seen the alveolus all "shot up," and the pa-

* Dr. Grieves having given the time immediately following his paper for the reading of the reports of Dr. Gies and the Research Committee, the following discussion was written by consent of the society.

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tient in pain for a few days, with radiographic proof of as great a periapical necrosis as from arsenic or infection, and sometimes a real periosteitis accompanied by the loss of the tooth from both these procedures. No one denies the sterilizing value of either of these drugs. I have used mild iodin ionization successfully, and by "mild" I mean such light currents as will carry the iodin without coagulating the tissues. Dr. Rhein's method, or any method, can at best only destroy the infective element lying in the tissue. The trouble lies here as in the old antiseptic surgical period; he destroys a comparatively large area of good cells and coagulates the tissues in his attempt to sterilize a small area, and leaves it all there. Good surgery, consisting in curetment and apicoectomy, would remove all such, leaving a healthy blood-clot for normal repair. So, in instances I have known, other operators have been compelled to remove by good surgery all the tissue Dr. Rhein says he does not damage by using elements which may be good chemically but are bad biologically. Ionization and sodium and potassium destroy and deeply oxidize tissue, just as did the old cautery treatment; every surgeon now recognizes the dangers of leaving this scarred and shortly-to-be-necrotic tissue as a nidus in the body, a fitting medium for microbic invasion and adaptation. The old idea of cauterizing out the tonsils rather than the recent knife operation is an example, and this method is roundly condemned, because all the organisms lying deeply in the tissue are not destroyed, while the cells are, which in turn only furnishes greater pabulum for microbic growth. I am told that one of Dr. Rhein's favorite demonstrations to his class—of which, unfortunately for me, as he implies, I have not been a member—is the shriveling of the muscle fibers in a piece of beef exposed to ionization of sodium chlorid and a zinc point. This results in true tissue coagulation and necrosis, he claims, by the formation of zinc chlorid. I claim that it results by nascent chlorin, principally, because the loss on the zinc point is infinitesimal in many applications; also it is, I believe, poor chemistry to say that zinc chlorid would be formed under these conditions. Dr. Rhein objects to the oxidation of tissue by formaldehyd, carbolic acid, etc., but does not hesitate to oxidize and destroy cells with sodium and potassium or nascent elements, or even zinc chlorid, if you please. I am not at all disturbed by Dr. Rhein's strictures on my lack of knowledge of pathology when he criticizes the use of the term "tissue necrosis;" it would mean just what it says to anyone trained in modern pathology. There can occur necrosis of all types of tissue, other than bone. Minute areas in the soft tissues with little demarcation are not unusual. It was these I had in mind. Evidently Dr. Rhein knows no necrosis except that of bone in a large way, the old idea of arsenical necrosis of the jaws, and when he speaks of "air-spaces intermixed with bone" occurring in the living body, I am willing to rest my argument there, and let you decide as to his pathology. His utter lack of comprehension of the normal and increasing cemental deposits which occur at the apex throughout life, which have been described by all histologists, and which he could study in known specimens out of the mouth, if he would only take the time, accounts for the errors into which he has fallen, and which all those who depend entirely

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upon radiographs are apt to make. I repeatedly said in my paper, and say again, that these deposits are not pathologically hyperplastic, but are evidences of normal growth according to age—reparative processes. When Dr. Rhein has ground, decalcified, and studied as many apices, particularly of roots that he has treated and of which he knows the histories, as I have, I will be willing to again discuss this matter with him; at present I should prefer to leave it with the authorities quoted.

Dr. Rhein seriously misquotes me when he says that I disparaged the radiograph; no such conclusion can be reached from anything I have ever said. I believe in, use, and value radiographs, but they are far from the whole story; it is so easy to mask a periapical area by shifting the tube a bit. I would no more condemn a tooth solely on radiographic evidence than I would claim complete recovery of a periapical area on the same evidence without clinical data. Dr. Rhein agrees with me that necrosis of the cemental apex is nearly always fatal to the tooth, and that then nothing but apicoectomy will save it, and that rarely; and yet he believes that all this which he does to the apex will not produce this necrosis by damaging the tissues beyond the peridental membrane. That he has little knowledge of the pathology of this whole area is made plain in this remark: "Unfortunately, however, many operators have been accustomed to making a diagnosis of impaired cementum when it does not exist. The diseased area lies in the alveolar structure, and, as a rule, never interferes with the normality of the cementum, which is amply protected by the pericementum." After all that my paper contained—which I feared the society would consider too rudimentary —relative to the attachment of the pericementum to the tooth, its blood supply, and the fact, which all histologists know, that the pericementum cannot lie in healthy contact with the apex of a pulpless tooth if the alveolus and its blood supply be destroyed back of it, we will not waste time further on this remark. I wish Dr. Rhein would tell us how he knows from radiographs that the pericementum covers the apex when the "alveolus is destroyed beyond it." How, moreover, does he diagnose a necrotic apex? I am not convinced that the chloro-percha mixture left in the tissue —and I understand that iodoform is occasionally incorporated with it—is really as inoffensive as Dr. Rhein would have us believe. In my experience, any solvent makes what we call gutta-percha, which is gutta-percha with a large percentage of zinc oxid and coloring matter, very porous; if allowed to dry it shrinks from the root-canal walls; and on contact with the soft tissue it swells up. I am not at all sure that it fills the perforated root-apex as well as the radiographs appear to show. The metallic salts figure in the radiograph. I can pump a salve of zinc oxid, which is no filling at all, through an apex and get the same type of picture; pure gutta-percha is scarcely visible in a radiograph. I shall also have to be further convinced of the sterilizing power of chloroform used as a solvent, and to my mind Callahan's method is nearer the ideal. We all know that it is perfectly possible to enlarge and manipulate radiographs by photography to show almost anything. I displayed on the screen two of Dr. Rhein's so-called successful root-filling cases, which he published in the *Items of Interest,* and he did not even recognize them. In these

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the rarefied areas were quite as large as other apices where the fillings did not project through the root, and would of course have been condemned by him. You can read almost anything into a radiograph, but I am not prepared, even in the face of so eminent an authority as Caldwell, to admit that what Dr. Rhein shows around the immediate root-ends is good bone, for, as I said in the paper, I have cut down on such areas, only to find no bone and often to obtain cultures. The only radiographic authentic evidence is the repetition of the film later from the same angle as in the first picture, and I would never venture an interpretation of any one exposure.

I am glad that Dr. Rhein has mentioned the fact that we have discussed this matter at other meetings, because that gives me an opportunity I would not otherwise have had, to say that at Washington two months ago he stated that he perforated and projected in every case; in Brooklyn, a month ago, he declared that he did it in only about one-half his cases, and he does not state what his practice is today. This raises the question as to just what he *does* practice, anyway! From all that he has said in opposition to any filling which does not project—and judging from all the noise that he has made about it, a filling is not correct which does not pass into the soft tissues and beyond the root, and yet in Brooklyn he said that he did not practice protrusion in all cases—then, according to his own contradictory statements he did not fill those roots correctly. Obviously a practice cannot be right and wrong at the same time. You must either protrude the gutta-percha point every time, or not at all, to be consistent. Further, every foraminal opening must be perforated and the filling projected, no matter what its curvature or how many openings in the apex. Have you ever noticed how straight all these root-canal fillings look apically in radiographs, and how crooked the root-apices, of upper molars, for instance, look when extracted? The doctor remarks that "osseous regeneration of the alveolar structure has never been attained by the essayist," and implies that I never have really filled a root-canal—this might be taken personally, did I not know M. L. Rhein. Once in a while I *do* fill a root-canal, and I would suggest the study of anybody's library of radiographs by a committee from this society, believing that it will show as many rarefied areas about well-filled roots as about those not so well filled—the rarefied areas, which I have repeatedly claimed are caused by devitalization and destruction of surrounding tissues in the effort to devitalize the pulp and fill the canal, not being necessarily prevented by the perfect root-canal filling. Dr. Rhein presents a radiograph of an operation done twenty-five years ago and claims great results. I wonder if he was taking radiographs that long ago. If not, how does he know what the condition of the alveolus was prior to the operation? How far did he then intend to protrude his filling? Maybe it was an accident. And how recent are these pictures? To my mind this one slide presents beautifully the point made in the paper relative to the resorption of the apex, leaving as my slides show good bone near the gutta-percha point. Dr. Rhein claims that I have presented a theory only, while I believe that the slides of cases which I have shown are proof of my contention as far as the work has gone. I am astonished that he repeatedly claims by

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his method to produce in a septic apex and infected surrounding tissue an area which will be "absolutely free from further infection," and in which "reinfection cannot take place." He evidently has no conception of blood-borne infections or those conveyed by endogenous means. Two weeks in my clinic at the hospital would, I am sure, convince him, if he be of unprejudiced mind, that there are no areas in the human body which are absolutely free from infection. Even a projecting gutta-percha point in such a long-suffering tissue as the alveolus might finally be the area of lowered local resistance to hematogenic infection. I thank the society for their courtesy in asking me here, and apologize for the length of my remarks.

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Report of the Committee on Scientific Research.

By W. B. DUNNING, D.D.S., Chairman.

YOUR committee has the honor to report as follows on the work of the year closing at this meeting of the society:

On June 29, 1914, Prof. Wm. J. Gies wrote the chairman, giving the outline of an extensive scheme of research into the subject of the internal secretions, which would involve the expense of $1500 for the year's work. Our society appropriated $500 towards that sum, and the National Research Commission contributed $500, making our total funds for the year $1000.

The extended plan required special chemical and histological assistance, together with the aid of a paid assistant, daily, including Sundays and holidays, in the work of feeding and caring for the many groups of animals involved. It was impossible, with the funds in hand, to undertake this program, and Dr. Gies decided it would be better, for this year, to work on a smaller scale along lines of preparation for the larger work. By so doing he has enabled the committee to save $500 toward next year's budget. The payments from the National Research Commission have been sent in instalments of $50 from the chairman, Dr. Price, directly to Dr. Gies, and these sums have been applied to running expenses; the society's appropriation is still intact. None of this saving would have been possible had it not been for the generous action of Columbia University in paying heavy bills for animals and for installation of breeding cages, chemical and other supplies, food for animals, etc.

An elaborate scheme for the efficient breeding of animals and of accurate control of diet, etc., during experimentation has been worked out this year.

Professor Gies' report for this year will comprise:

(1) A presentation of the findings in experiments on the ingestion of "deficiency diets" and of ductless glands, with special reference to the development, dimension, weight, curvature, and calcification of the incisor teeth of albino rats under such treatment.

(2) Preliminary data of a study of the dental effects of parathyroidectomy, as compared with those of thyro-parathyroidectomy, will be outlined.

(3) The distribution in teeth of trypan blue, after the injection of that pigment, will be considered.

(4) The permeability of enamel to water will be discussed.

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(5) The bearing of data of these kinds on variability in the structure and composition of dentin and enamel will be indicated.

(6) Plans for further study will be suggested.

The committee has communicated with Dr. Price, urging that if possible the National Research Commission repeat its contribution of $500 for the coming year, and we hereby strongly recommend that our society appropriate $500 for the same purpose. This, with funds in hand, will give us the required $1500 to carry out the plan toward which Professor Gies has been working.

Professor Gies requests that he be informed as to the wishes of our society at the earliest possible date, preferably by June 1, 1915. He will require eleven months to carry out his program, and should therefore begin by that date, if practicable.

Your committee earnestly hopes that Professor Gies will receive the cordial support of the Dental Society of the State of New York in furthering this work so fundamental in the advancement of dental science.

Respectfully submitted,

WM. B. DUNNING, *Chairman.*
A. H. MERRITT.
L. M. WAUGH.

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Studies of Internal Secretions in Their Relation to the Development and Condition of the Teeth.

By WILLIAM J. GIES and COLLABORATORS.

(*From the Biochemical Laboratory of Columbia University, at the College of Physicians and Surgeons, New York.*)

2. Effects of Feeding Glandular Tissues, Preparations, and Extracts.[1]

By EDGAR G. MILLER, Jr., B.S., Ph.D., ASSOCIATE IN BIOLOGICAL CHEMISTRY, COLUMBIA UNIVERSITY, and WILLIAM J. GIES, Ph.D., Sc.D., PROFESSOR OF BIOLOGICAL CHEMISTRY, COLUMBIA UNIVERSITY.

BEING the first section[2] of the *fifth* annual report, by William J. Gies and collaborators, on investigations under the auspices of the Research Committee of the Dental Society of the State of New York, Dr. Wm. B. Dunning, chairman; and the first section of the *first* annual report on investigations under the auspices of the Scientific Foundation and Research Commission of the National Dental Association, Dr. Weston A. Price, chairman.)

[1] The first paper in this series was published in the *Dental Cosmos*, 1915, lvii, p. 276, and reprinted in the *Transactions of the Dental Society of the State of New York*, 1914, p. 105.

[2] The remaining two sections of this report describe experiments on the influence of "unbalanced" diets on dentition. See *Transactions of the Dental Society of the State of New York*, 1915, pp. 189 and 192.

The fifth annual report of which this is the first section was presented orally by the senior author at the meeting of the Dental Society of the State of New York, in Albany, May 14, 1915. All the work then described by him was actively in progress, and has been continued daily throughout the past summer. The *oral* report on this section of the work was based on the data of the first nine experiments (37 rats, 148 incisor teeth). This amplified report gives all the analytic data that were available on or before September 28, 1915—including the results of fifteen additional experiments (60 additional rats, 240 additional incisor teeth)—for a total of 97 rats and 388 incisor teeth. This series of experiments is in progress.

The extension of our experiments during the past summer has presented so many additional details for the published account of this section of our report that the stenographic version of the senior author's oral statement at Albany has been wholly rewritten and the data reclassified.

The brief general discussion that followed the conclusion of the oral report, a stenographic account of which will be appended to the concluding section of this report, was very general in scope and wholly approbative in character. The amplification of this report, it will be found, does not affect, in any degree, the pertinence of any of the statements by the speakers who participated in the discussion. (See page 224.)

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I. Introduction.

In the first paper of this series,[3] we presented the results of experiments on the dental effects, in albino rats, of thyro-parathyroidectomy and of thymectomy. At the end of that paper we stated the following general conclusions:

Our data for *thyro-parathyroidectomy*, while suggesting support of Erdheim's conclusions regarding the decalcifying effects of parathyroidectomy, are inconclusive. The experiments will be continued.

The experiments on *thymectomy* failed to show that calcification processes were in any way affected by removal of the thymus.

Rhachitic changes in the bones and teeth occur in young albino rats as the result of *spontaneous* disease, possibly of infective origin. This disease is often, but not always, accompanied by an arrest of growth and by malnutrition.

Our experience has shown that many variables in studies of this kind must be more effectively controlled than previous workers (or we ourselves) have done, to insure reliable foundations for sound deductions regarding specific effects from particular causes.

Our desire to repeat and to extend the experiments along the original lines could not be gratified, during the past year, because of lack of sufficient funds for the purpose. Accordingly, we devoted our available financial resources, for a continuance of these studies, to less expensive work along collateral though equally important lines. We have aimed, through the agency of "feeding experiments," to ascertain, if possible, the most promising selections of interno-secretory materials for an extended study of dental effects that might be induced by *hyper*secretion in one or more of the ductless glands. This section of our report deals directly with experiments involving the action of "internal secretions" *administered orally*, and covering a comparatively wide range of selections of such factors.

There is very much to consider in current literature, on the subject of the influence of internal secretions generally, but very little to present *that is new* that applies, except by implication, to the teeth specifically. Under such circumstances, formal discussion of recent literature on our subject can appropriately be postponed, and we shall proceed directly to a description of our methods and a statement of our results.

II. Experimental.

ANTE-MORTEM PROCEDURE.

The twenty-four experiments described in this paper were performed on young albino rats. Each experiment was conducted with at least four members of a given litter, unless otherwise necessitated and so specified. In most of the experiments the rats were of the same sex for a given test. When the rats in a group were not of the same sex, the sexes were equally represented. There was only one exception to this rule. (See Table 2, exp. 7.)

Each group of rats was kept in a suitable cage, in a room in the laboratory from which chemical work was wholly excluded. Ventilation was good and the temperature comfortable.

Each cage was an ordinary wooden or metal box, large enough to permit free movement among the rats confined in it. The open top, or side, of the box was closed with a removable or adjustable frame covered with wire netting. The bottom of each cage was covered with coarse sawdust. This bedding was repeatedly renewed, so that excreta could not accumulate detrimentally.

[3] Morgulis, Perlzweig, and Gies: *Dental Cosmos*, 1915, lvii, p. 276; *Transactions of the Dental Society of the State of New York*, 1914, p. 105.

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A good supply of water was maintained continuously in each cage in a small mortar of thick porcelain. This vessel was so heavy that each group of rats could perch on its edge without tilting it. The mortar was washed, and the supply of water renewed, at least once a day.

Each group of rats was given an abundance of good food daily. During the earlier periods of the first ten experiments the diet on a given day was chiefly a supply of a particular cereal—corn, barley, or oats, together with the meat or tissue connected with the daily dosage as indicated below. The rats grew steadily on this diet. During the later periods of the first ten experiments and throughout the remaining fourteen, the appended weekly dietary schedule was followed, with only occasional and unimportant exceptions by way of miscellaneous additions of a suitable character:

Sunday. Cabbage, cheese.
Monday. Corn, meat.
Tuesday. Barley, bread.
Wednesday. Oats, meat.
Thursday. Corn, bread.
Friday. Rye, cheese.
Saturday. Oats, meat.

In some of the later experiments butter was occasionally added to the diet. Now and then each group received, at night, an additional supply of such food as bread, milk, meat, potato. In every instance such food was added to the supply for a *group,* in order that the "control" and "experimental" rats would be affected equally so far as feeding opportunity was concerned.

This free method of feeding afforded "equality of opportunity" in the matter of feeding, but it did not insure quantitative equality of ingestion or nutrition. For preliminary experiments of this character, as these were intended to be, it was regarded as sufficient, however, to proceed in this way, since the aggressive conduct of the rats in every group made it certain that each rat obtained a fair share of the available supply every time food was presented.[4]

That our judgment in this connection was correct in the main, and that there were no misleading effects due to the purely dietary conditions, is indicated by the weight-records of the experiments in which there was obviously no appreciable effect of dosage on body-weight, as is shown by the accompanying typical data (Table 1). These representative results show that the animals received food that was adequate in quality and ample in quantity for active growth.

The dietary conditions of these experiments were liberal in every sense of the word. As a rule, a little more food was presented daily than the rats were inclined to eat. That the diet was nutritionally adequate was shown not only by the normal condition of practically all the control rats, but also by the fact that our "breeding colony" of rats, on the same daily dietary schedule, was and remains free from disease, and has been breeding generously and repeatedly right along. The individual members of this "breeding colony" are strong, active, and growing steadily.

[4] The temporary isolation of every rat in each experiment, for the receipt regularly, several times daily, of weighed amounts of food and measured volumes of water, with determinations of the quantities of the uneaten portions, if any, in each instance, is the best scientific dietary procedure in such feeding experiments. It would have been followed if our available financial resources had made it possible to obtain the assistance necessary for the execution of such an exacting program.

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TABLE 1.—TYPICAL DATA PERTAINING TO THE BODY-WEIGHTS, IN GRAMS, OF SUB-GROUPS OF RATS, AS RECORDED WEEKLY AND GIVEN IN WHOLE NUMBERS. (*See also Table 2.*)

No. of experiment.	Glandular material ingested.	Sub-group.	Weight at the beginning of the experiment.	Duration of the experiment. Weeks. 1	2	3	4	5	6	7	8	9	10	11	12	13
6	——	C[1]	61	66	85	93	100	117	122	135	146	151	164	. .	. .	. .
	Parathyroid	E	67	67	76	94	105	120	128	140	140	145	157	.	. .	. .
7	——	C	73	82	104	120	127	141	157	168	187	199	196	.	. .	. .
	Pineal	E[2]	102	103	131	145	158	176	184	196	203	218	228	. .	. .	. .
10	——	C	44[3]	60	81	88	97	108	116	129	149	. .	. .	. .	. .	. .
	Pituitary (ant. lobe)	E	54	58[4]	75	85	95	101	107	111	144	. .	. .	. .	. .	. .
12	——	C	57[5]	61	69	78	113	120	122	132	136	138	139	140	141	145
	Pituitrin	E	52	56	64	74	88	98	98	99	102	102	108	115	117	119
2	——	C	164	187	203	206	235	240	247	263	272	285	277	292	301	310
	Spleen[6]	E	170	201	215	214	237	235	250	251	250	252	251	261	276	286
19	——	C	64	68	81	92	109	124	136	146	147	152	157	170	. .	. .
	Suprarenal	E	66	61	72	82	95	112	123	133	137	148	150	169	. .	. .

[1] C indicates "control" rats; E, "experimental," i.e. *treated*, rats.

[2] The group consisted of *three* rats.

[3] Taken 5 days before that of E.

[4] Taken 2 days after the first weight.

[5] Composite weight due to substitution. See "quotations from protocols," Exp. 12.

[6] Weights taken at end of 14th week. C–320 and E–307, were not strictly comparable in time.

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Nothing was done to "keep down" the inevitable lice. With very few exceptions the rats themselves accomplished it with marked success, evidently deriving exhilarating exercise from this occupation, and nullifying thereby much of the debilitating influence of enforced confinement. Like David Harum's dog, they enjoyed the diverting "excitement of the chase"—and many of them!

The condition of the animals was noted by each of us several times daily; with rare exceptions by one of us until long after midnight.

At the beginning of each experiment the individual rats of a group were weighed and paired on the basis of approximate equality in weight, one of each pair serving as a "control" rat (C), the other as an "experimental" rat (E). The animals were weighed weekly.

The rats were suitably marked with picric acid, excess of which was carefully washed off immediately with water. "Control" rats in a group are designated CA and CB, in the tables; "experimental" rats, EC, ED, EE. In this notation the second letter indicates the individual in its *group* and *sub-group* sequences.

At our convenience daily (including Sunday during the last ten experiments) the "control" and "experimental" rats in each group were transferred from their cages to small boxes and there simultaneously given small amounts of additional food (meat or bread). The quantities of such extra food per rat, per group, were approximately equal. To the portions offered to the "experimental" rats, however, were added the glandular preparation, or extract, whose influence was to be tested. In the experiments involving fresh glandular *tissues*, however, the control rats were given meat without glandular tissue, but the experimental animals received an equal bulk of glandular tissue without meat. In all cases the extra food presented under these conditions was promptly eaten, apparently with relish. Soon after this food had been eaten, the rats were returned to their cages.

These conditions unavoidably lacked nutritive uniformity; and to this extent the two sub-groups of rats in each experiment were on different nutritive planes. That these purely dietary differences were too slight, from the general nutritive standpoint, to influence the dental results, is strongly indicated by the available data on this point in the accompanying Tables (2 and 4), as may be seen there at a glance.

Each experiment was continued long enough, we believed, to afford ample opportunity for the elicitation of effects, if any were possible.

KINDS OF INTERNO-SECRETORY MATERIALS USED IN THE TESTS.

The nature, origin, and condition of the glandular tissues, preparations, and extracts, employed in these experiments, are indicated in the following summary:

Corpus luteum. "Desiccated corpora lutea." Powder; in 5-grain capsules, each "equivalent to about 30 grains of fresh corpora lutea." Parke, Davis and Co.: 1,900,559. (Experiments 9 and 20.)

Lymphatic gland. "Cervical lymphatic glands: desiccated and defatted." Powder. Parke, Davis and Co.: "Research ℞ No. 091,-518. (Experiment 13.)

Parathyroid gland. "Desiccated parathyroid glands," in 1/10-grain compressed tablets, each "equivalent to 3/5 grain of fresh glands." Parke, Davis and Co.: 1,894,207. (Experiments 6 and 16.)

Pineal gland. "Pineal glands (desiccated)," in 1-grain tablets, each "equivalent to 1/2 grain of fresh gland." Parke, Davis and Co.: 025,909. (Experiments 7 and 17.)

Pituitary gland. "*Anterior* lobe of the

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pituitary body." "Desiccated substance," in compressed 2½-grain tablets. Parke, Davis and Co.: 1,878,735. (Experiments 10 and 18.)

Pituitrin. "Pituitary extract (P., D. & Co.)," in "glaseptic ampoules," 1 cc. containing 0.005 gm. of chloretone. "Aqueous solution prepared from the infundibular portion or *posterior* lobe of the pituitary body." Parke, Davis and Co.: 1,900,890. (Experiments 12 and 21.)

Salivary gland. Submaxillary glands from oxen. Obtained by us, fresh, in a N. Y. slaughter-house; hashed and kept in a frozen condition. (Experiments 14 and 23.)

Spleen. Spleen from oxen. Obtained by us, fresh, in a N. Y. slaughter-house; hashed and kept in a frozen condition. (Experiment 2.)

Suprarenal gland. "Suprarenal glands; desiccated. U.S.P." Powder. Parke, Davis and Co.: 1,876,856. (Experiments 8 and 19.)

Testicle. Testes from oxen. Obtained by us, fresh, in a N. Y. slaughter-house; hashed and kept in a frozen condition. (Experiments 1 and 24.)

Thymus gland. (*a*) Thymus glands from oxen. Obtained by us, *fresh*, from a N. Y. slaughter-house; hashed and kept in a frozen condition. (Experiment 3.)

(*b*) "Thymus gland, *desiccated.*" Powder. One grain "represents 5 grains of fresh thymus gland from sheep." Parke, Davis and Co.: 1,856,729. (Experiment 22.)

Thyroid gland. (*a*) Thyroid glands from oxen. Obtained by us, *fresh*, in a N. Y. slaughter-house; hashed and kept in a frozen condition. (Experiments 4 and 5.)

(*b*) "Thyroid glands; *desiccated*, U.S.P." Powder. "One grain represents 5 grains of fresh thyroid glands." Parke, Davis and Co.: 1,870,356. (Experiments 11 and 15.)

We are greatly indebted to Parke, Davis and Co. for the gift of that portion of the supplies on this list that was ordered from their freshest preparations for this research, but for which they have not accepted payment.

QUOTATIONS FROM THE PROTOCOLS OF THE EXPERIMENTS.

Data bearing significantly on the condition of the rats in each experiment, as the tests proceeded, are summarized below from our records. Unless otherwise indicated below, in the quotations from the protocols, the following statement of *general* facts applies to *all* rats in each experiment:

A. The rats were selected from a given litter born in this laboratory—in each case, of mothers in our own "breeding colony." Rats as nearly the same size as possible were taken. (The earlier experiments, which were started before our "breeding colony" had been developed, were conducted with rats obtained from Miss Abbie Lathrop, of Granby, Mass., as is noted below for each such instance.)

B. Nutritive condition good. Animals hale and hearty.

C. Teeth normal in general appearance; length, width, thickness and curvature not materially affected by the treatment.

D. When a group of rats consisted of representatives of both sexes, it was definitely observed, in each case, that pregnancy had not occurred at any time during the progress of the experiment.

E. Immediately after the death of an animal in a group was discovered, an associated C or E rat was chloroformed, so that the "time element" was uniformly the same for all the corresponding C and E rats in a group.

F. At autopsy nothing abnormal was observed. The thymus, thyroid, parathyroid, and ovaries or testicles, appeared to be normal in the later experiments (these organs had not been examined carefully at the earlier autopsies).

For the reader's convenience, the *special* data of the experiments are summarized below, from the protocols, in the alphabetic order of the names of the glandular factors involved, the numerals at the heads of the sub-sections indicating the experiments in the order of their inauguration and in their sequence in the arrangement of analytic and other data in Tables 2 and 4.

CORPUS LUTEUM (desiccated). **9.** The rats were received from Miss Lathrop. The date of birth recorded in Table 2 is not certainly correct, though approximately so. Although normal in general, the rats were small and not well nourished. *Steady gain* in weight throughout. *Daily dose:*[5] One capsule (5

[5] The figures for "daily dose," in this and all the other experiments, indicate the average daily dose per *treated* (E) rat.

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grains) was emptied into a mortar and triturated there with the allotted small amount of meat. Half this mixture (2½ grains) was given to the pair of E rats, each receiving approximately 1¼ grains, the equivalent of about 7.5 grains of *fresh* corpus luteum. The residual half-portion was allowed to dry in the mortar in which the mixture had been made. Desiccation occurred promptly. On the following day, after moistening it, this residual half-portion was administered. This routine was repeated every two days.[6] (Human dose: 5 grains, thrice daily.)

20. Two rats were taken from each of the litters represented in Exp. 18 and 19. *Steady gain* in weight in all except ED, which failed to grow after July 10th. Its thymus was abnormally small; appeared to be normal otherwise—merely dwarfed. *Daily dose:* 2½ grains to July 10th; thereafter, to August 20th, increased occasionally to 10 grains (equivalent to 15 and 60 grains of *fresh* corpus luteum, respectively).

LYMPHATIC GLAND (desiccated). **13.** One pair was from a litter received from Miss Lathrop. *Steady gain* in weight throughout. *Daily dose:* 0.125 gm. desiccated and delipined cervical lymphatic gland.

PARATHYROID GLAND (desiccated). **6.** *Steady gain* in weight throughout. Additional members of the same litter were used in Exp. 7. *Daily dose:* One-fourth of a tablet (1/40 grain), the equivalent of approximately 3/20 grain of *fresh* parathyroid. (Human dose: 1/10 grain, equivalent to 3/5 grain of *fresh* tissue.)

16. The rats were from the litter represented in Exp. 15. *Steady gain* in weight throughout to July 31st; thereafter, to August 7th, only 0.5 gm. (C pair), and 1.0 gm. (E pair), respectively. *Daily dose:* One-fourth of a tablet (1/40 grain) to May 31st; thereafter, to July 10th, 1/20 grain; thereafter, to August 4th, increased occasionally to 1/5 grain—equivalent, respectively, to 3/20, 3/10, and 1¼ grain of *fresh* parathyroid.

PINEAL GLAND (desiccated). **7.** Two females (CA and EC) and one male (ED)—additional members of the litter represented in Exp. 6—were combined in a group with one female (EE) and one male (CB) from a litter born February 2d. This was the most advantageous combination that could be effected at the time. *Steady gain* in weight throughout. *Daily dose:* One-sixth of a tablet (1/6 grain), equivalent to 1/12 grain of *fresh* pineal gland. (Human dose: 1 to 2 grains, equivalent to 1/2 to 1 grain of *fresh* tissue.)

17. *Steady gain* in weight throughout. *Daily dose:* One-fourth of a tablet (1/4 grain) to May 31st; thereafter, to July 10th, 1/2 grain; thereafter, to August 5th, increased occasionally to 2 grains—equivalent, respectively, to 1/8, 1/4, and 1 grain of *fresh* pineal gland.

PITUITARY: *anterior* lobe (desiccated). **10.** The rats were received from Miss Lathrop. Lack of sufficient animals made it necessary to use two pairs from two litters. The date of birth recorded in Table 2 is not certainly correct, though approximately so. Except for diarrhea the day before the beginning of the experiment, the rats appeared to be normal, though undernourished. *Steady gain* in weight throughout. *Daily dose:* One-fourth of a capsule (5/8 grain) of desiccated substance. (Human dose: 2½ to 5 grains per day.)

18. Two additional rats from the same litter were used in Exp. 20. All weights increased to July 17th; EC then declined rapidly, and died ten days later. (Its testicles were abnormally small.) Thereafter, to the end of the experiment (August 10th), the control animal held its weight, but the surviving treated rat gained steadily. *Daily dose:* One-fourth of a capsule (5/8 grain of desiccated substance) to May 31st; thereafter, to July 10th, 1¼ grain; thereafter, to August 9th, increased occasionally to 2½ grains.

PITUITRIN. (Extract of pituitary gland, *posterior* lobe.) **12.** One of the control rats was injured, by accident, four days after the beginning of the experiment, and another from the same litter was substituted. *Steady gain* in weight throughout. *Daily dose:* Half-minim of pituitrin, *on bread.* (Human dose: 8 to 30 minims, hypodermically.)

21. Two pairs of rats from two different litters. Two additional rats from each of these litters were used in Exp. 22. Very slow increase in weights to a low maximum for C rats—84.5 gm. on July 24th, with a fall to 78.5 gm. on August 7th, and a return to 84.0 gm. on August 9th. The E rats slowly increased regularly to 90.0 gm. on August 9th. *Daily dose:* One minim of pituitrin, on bread, to July 10th; thereafter, to August 8th, increased occasionally to 8 minims (1/2 cc.).

SALIVARY GLAND (preserved frozen). **14.** The rats were received from Miss Lathrop. They were comparatively small, though nor-

[6] This method of procedure was followed systematically for the experiments in this series that involved the use of *dry* preparations. In the later experiments involving the largest doses, the mixtures were made daily instead of every two days.

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mal otherwise. Two pairs were taken from two litters. *Steady gain* in weight throughout. *Daily dose:* 0.125 gm. fresh salivary gland.

23. The litter was large (twelve) and the animals undersized. Four additional rats from the same litter were also used in Exp. 24. There was slow increase in the weight of the pair of C rats to a maximum, 83.0 gm., on August 14th. One of the controls (CA) began to decline July 24th, and died August 28th, half the size of its associate. The E rats gained slowly, to a maximum at 96 gm., on August 28th, when one, the smaller (EC), was killed to make a pair with CA. The experiment was ended a week later, without further gain of weight for the rats that survived to that time. CA was emaciated and had practically no thymus. CB had a small thymus and unusually large thyroids. The thymus of each E rat was larger than that of either C rat. *Daily dose:* 0.25 gm. of fresh salivary gland, to July 10th; thereafter, to August 21st, gradually increased to 4 gm. of gland and continued at that amount.

SPLEEN (preserved frozen). **2.** The rats were selected from the only available stock at the time—three from one litter, one from another (EC). Weights increased fairly regularly to the end of the experiment, except in the case of ED, which attained its maximum February 26th, then fell and returned by April 16th. *Daily dose:* 0.125 gm. of fresh spleen to February 3d; thereafter, 0.5 gm. of tissue.

SUPRARENAL GLAND (desiccated). **8.** The rats were received from Miss Lathrop. The date of birth recorded in Table 2 was not certainly correct, but approximately so. *Steady gain* in weight throughout. *Daily dose:* One-half of a grain of desiccated suprarenal gland. (Human dose: 2 to 6 grains, thrice daily.)

19. Two additional rats from the same litter were used in Exp. 20. *Steady gain* in weight throughout. *Daily dose:* One grain of desiccated suprarenal gland to July 10th; thereafter, to August 14th, increased occasionally to 2 grains. Food was rendered distasteful by larger quantities. The meat-mixture was markedly discolored promptly by even smaller proportions.

TESTICLE (preserved frozen). **1.** The rats were selected from the only stock available at the time—mixed litters, two mothers. They were received from Miss Lathrop. The date of birth recorded in Table 2 is not certainly correct but approximately so. (Note the inequality of the initial weights.) The weight of CA attained the maximum on March 19th (158.4 gm.) and then declined gradually. The weights of the rest of the rats were practically stationary after March 19th. *Daily dose:* 0.125 gm. of fresh testicle to February 3d; thereafter 0.5 gm. of tissue.

24. The rats were taken from the litter represented in Exp. 23. The animals were undersized. There was steady increase in the weight of each rat, except as noted below. EC manifested convulsive symptoms for several days prior to July 10th and was found dead that day. ED became paralytic in its hind quarters about the same time, gained in weight until July 17th (34.5 gm.), then declined to 31.5 gm., on July 23d, when it died. *Daily dose:* 0.25 gm. of fresh testicle.

THYMUS GLAND (preserved frozen). **3.** *Steady gain* in weight throughout. *Daily dose:* 0.125 gm. of fresh thymus to February 3d; thereafter, 0.25 gm. of tissue.

THYMUS GLAND (desiccated). **22.** Two pairs of rats were taken from the two litters represented in Exp. 21. The weights of the C rats increased slowly to 95.0 gm. on July 31st; fell to 91.0 gm. on August 14th; rose to 102.5 gm. on August 28th, and fell to 100.5 gm. on September 4th (the day the experiment was ended). The weights of the E rats rose steadily though slowly to 130.5 gm. Compared with the equivalent rats from the same litters in Exp. 21, the weights on August 7th (two days before the conclusion of Exp. 21) were—

	C	E
Exp. 21	78.5 grams	85.0 grams
" 22	91.5 "	106.5 "

These differences are due, presumably, to the fact that the rats in Exp. 22 ingested meat, whereas those of Exp. 21 ate bread, at the times of daily dosage. *Daily dose:* 0.5 grain of desiccated thymus to July 31st; thereafter, to August 28th, occasionally increased to 15 grains and continued at that amount to September 3d (equivalent, respectively, to 2.5 and 75 grains of *fresh* thymus gland.) (Human dose: 2 grains, five times daily.)

THYROID GLAND (preserved frozen). **4.** Steady increase in weight to February 26th. *February 27th:* EC found dead, no symptoms noted; ED refused to eat thyroid tissue, was unwell and inactive. During the afternoon ED had a convulsion lasting about a minute. *February 28th:* ED found dead. *Daily dose:* 0.125 gm. of fresh thyroid gland to February 3d; thereafter, 0.25 gm. of tissue.

5. Six rats were originally involved in this experiment. *February 28th:* We began with two pairs of males from two (the only) litters then available. One pair was born February

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8th (CA, EC), the other February 2d (CB, ED). *Mar. 19th:* E rats are not as active as the C rats. *Mar. 20th:* EC died after violent convulsions; CA was chloroformed and the experiment continued with CB and ED. *April 19th:* Two females (from a litter received from Miss Lathrop April 16th, born about March 26th) were added to this group—CE and EF. The latter rat was found dead, May 19th—no symptoms noted. Rats CB and ED were chloroformed May 6th. The C rats gained in weight rapidly (except CA); the E rats gained slowly (ED) or lost weight (EC, EF). We analyzed the teeth of only four of these six rats: CA, CE, EC and EF. In Tables 2 and 4 these four rats are designated, respectively, CA, *CB*, EC and *ED*. *Daily dose:* 0.125 gm. of thyroid gland.

THYROID (*desiccated*). **11.** The rats were received from Miss Lathrop. Of the male quartet selected from the available stock, two were members of one of the litters represented in Exp. 10—CA, EC—and two of the litter represented in Exp. 9—CB and ED. Ten days after the beginning of the experiment, EC died. CA was removed with it. Female rats—CE and EF—were substituted from one of the litters represented in Exp. 10. In the table, CB and CE are designated, respectively, CA and CB; ED and EF are there recorded as EC and ED, respectively. *Gain* in weight throughout, though very little in the case of EF (ED). *Daily dose:* One-eighth of a grain of desiccated thyroid gland (equivalent to 5/8 grain of fresh tissue.) (Human dose: 2 to 5 grains, thrice daily.)

15. The rats were from the litter represented in Exp. 16. There was steady gain in the weight of the controls. EC gained weight slowly, but died July 6th—no special symptoms were noted. ED began to decline about the same time, and died, after occasional convulsions, on July 30th. The E animals showed marked malnutrition. *Daily dose:* 0.125 gm. desiccated thyroid to July 6th; thereafter 0.25 gm. of dry material (equivalent to 0.575 gm. and 1.25 gm. of *fresh* thyroid, respectively).

GENERAL POST-MORTEM PROCEDURE RELATING TO THE INCISOR TEETH.

When, for any reason, a rat died or was killed during an experiment, a rat in the corresponding sub-group was chloroformed. At the end of an experiment, all the surviving rats were chloroformed.

After the death of a rat, its incisor teeth were obtained by careful dissection. The bone surrounding the teeth was cautiously cut away with a scalpel and no effort made to extract the teeth until they were loose enough for removal of the individual tooth in its entirety and without fracture. This result was achieved in almost every case for the 388 individual teeth involved. In the very few instances in which breakage accidently occurred, the process of removal had been conducted so cautiously that all parts were easily reassembled. By compression of the root of each extracted tooth, especially of the teeth of the younger animals, the bulk of the residual pulp was easily expressed and eliminated. Slight inequalities in the weights of dry teeth, as they are recorded in Table 4, were unavoidably introduced in this way, but such variations were certainly smaller than would have been the case if we had not approximately equalized the amounts of residual pulp by such intervention. The data in Table 4 show that any error in this relation must have been insignificant. In the further development of our analytic method, this particular procedure will be directly investigated, especially with reference to the effects on the analytic data of removal of the pulp by suitable instrumental means for that purpose.

The teeth were promptly dried at room temperature, or at 40° C., and ultimately bottled, prior to their preparation for analysis in group.

After the desiccation of the teeth and the thorough removal from each, with a dull scalpel, of all adherent extraneous deposits and fragments, the dimensions and curvature of each tooth were noted on quadrille-ruled paper. (It was found in all cases that the dimensions and

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TABLE 2.—DATA PERTAINING TO EFFECTS ON THE BODY-WEIGHTS OF THE RATS. (*See Table 3.*)

Exp. No.	Rat sub-group.	Sex of rat.	Glandular material ingested.[2]	Date of birth of rat.	Date of beginning of experiment.	Date of ending of experiment.	Age of rat at death.	Duration of the experiment.	Weight of rat.		
									Beginning of experiment.	End of experiment.	Gain.
				1914.	1915.	1915.	days.	days.	grams.	grams.	grams.
1	CA[1]	Male	. . .	Oct. 24	Jan. 7	April 16	174	99	130.6	130.2	—0.4
	CB	"	. . .	" 24	" 7	" 16	174	99	83.0	129.4	46.4
	EC[1]	"	Testicle	" 24	" 7	" 16	174	99	96.0	155.0	59.0
	ED	"	"	" 24	" 7	" 16	174	99	99.5	145.5	46.0
2	CA	Male	. . .	Dec. 8	Jan. 16	April 17	130	91	85.5	174.5	89.0
	CB	"	. . .	" 8	" 16	" 20	133	94	78.0	145.2	67.2
	EC	"	Spleen	" 9	" 16	" 17	129	91	78.5	155.8	77.3
	ED	"	"	" 8	" 16	" 20	133	94	91.5	151.0	59.5
				1915.							
3	CA	Male	. . .	Jan. 10	Jan. 30	April 27	107	87	46.5	{130.7	206.2
	CB	"	. . .	" 10	" 30	" 28	108	88		122.0}	
	EC	"	Thymus (fresh)	" 10	" 30	" 27	107	87	45.3	{102.0	185.1
	ED	"	"	" 10	" 30	" 28	108	88		128.4}	
4	CA	Male	. . .	Jan. 11	Jan. 30	Feb. 28	48	29	48.0	{65.5	81.2
	CB	"		" 11	" 30	" 28	48	29		63.7}	
	EC	"	Thyroid (fresh)	" 11	" 30	" 27	47	28	47.6	{46.5	49.8
	ED	"	"	" 11	" 30	" 28	48	29		50.9}	
5	CA	Male	. . .	Feb. 8	Feb. 28	Mar. 20	40	20	31.5	31.5	0.0
	CB	Female		Mar. 26	April 19	May 19	54	30	21.4	40.0	18.6
	EC	Male	Thyroid (fresh)	Feb. 8	Feb. 28	Mar. 20	40	20	35.0	34.5	—0.5
	ED	Female	"	Mar. 26	April 19	May 19	54	30	21.4	23.5	2.1
6	CA	Female	. . .	Feb. 8	Mar. 1	May 5	86	65	61.0	{93.0	102.5
	CB	"	. . .	" 8	" 1	" 5	86	65		70.5}	
	EC	"	Parathyroid	" 8	" 1	" 5	86	65	66.7	{75.9	90.2
	ED	"	"	" 8	" 1	" 5	86	65		81.0}	

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7	CA	Female	. .	Feb. 8	Mar. 1	May 5	86	65	31.2	62.0	30.8
	CB	Male	. . .	" 2	" 1	" 5	92	65	42.1	133.7	91.6
	EC	Female	Pineal	" 8	" 1	" 5	86	65	31.0	69.2	38.2
	ED	Male	"	" 8	" 1	" 5	86	65	34.4	86.5	52.1
	EE	Female	"	" 2	" 1	" 5	92	65	36.1	72.5	36.4
8	CA	Male	. . .	Feb. 20	Mar. 8	May 6	75	59	43.1	{76.5 70.2}	103.6
	CB	"		" 20	" 8	" 6	75	59			
	EC	"	Suprarenal	" 20	" 8	" 6	75	59	45.8	{70.0 77.5}	101.7
	ED	"	"	" 20	" 8	" 6	75	59			
9	CA	Female	. . .	Feb. 20	Mar. 8	May 6	75	59	29.6	{64.5 73.5}	108.4
	CB	"	. . .	" 20	" 8	" 6	75	59			
	EC	"	Corpus luteum	" 20	" 8	" 6	75	59	27.2	{72.0 62.0}	106.8
	ED	"	"	" 20	" 8	" 6	75	59			
10[3]	CA	Female	. . .	Feb. 20	Mar. 17	May 8	77	52	59.9	{67.0 81.7}	88.8
	CB	"	. . .	" 20	" 17	" 8	77	52			
	EC	"	Pituitary (ant. lobe)	" 20	" 17	" 8	77	52	58.0	{74.0 69.5}	85.5
	ED	"	"	" 20	" 17	" 8	77	52			
11	CA	Male	. . .	Feb. 20	Mar. 9	May 6	75	58	18.1	50.0	31.9
	CB	Female	. . .	" 20	" 19	" 6	75	48	36.5	55.2	18.7
	EC	Male	Thyroid (desiccated)	" 20	" 9	" 6	75	58	18.5	57.5	39.0
	ED	Female	"	" 20	" 19	" 6	75	48	42.4	55.0	12.6
12	CA	Female	. . .	Mar. 6	Mar. 27	June 25	111	90	26.2	70.0	87.5
	CB	"	. . .	" 6	April 1	" 25	111	85	30.8	74.5	
	EC	"	Pituitrin	" 6	Mar. 27	" 25	111	90	52.0	{44.2 74.4}	66.6
	ED	"	"	" 6	" 27	" 25	111	90			
13	CA	Male	. . .	Mar. 4	April 6	June 26	114	81	61.3	121.5	60.2
	CB	Female	. .	" 25	" 12	" 26	93	75	35.2	105.4	70.2
	EC	Male	Lymphatic	" 4	" 6	" 26	114	81	64.5	131.0	66.5
	ED	Female	"	" 25	" 12	" 26	93	75	36.5	93.0	56.5
14	CA	Female	. . .	Mar. 21	April 16	June 27	98	72	16.7	70.0	53.3
	CB	"	. . .	" 21	" 19	" 27	98	69	22.7	91.0	68.3
	EC	"	Salivary	" 21	" 16	" 27	98	72	16.5	66.5	50.0
	ED	"	"	" 21	" 19	" 27	98	69	21.7	93.0	71.3

[1] C rats are "control" ones—A (1) and B (2); E rats are "experimental," i.e. *treated*, animals—C (3), D (4), E (5).
[2] See summary of details regarding glandular materials used, page 165.
[3] The "weight of rats at the beginning of the experiment" was taken March 19.

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TABLE 2.—DATA PERTAINING TO EFFECTS ON THE BODY-WEIGHTS OF THE RATS—(*Continued*). (*See Table 3.*)

Exp. No.	Rat sub-groups.	Sex of rat.	Glandular material ingested.	Date of birth of rat.	Date of beginning of experiment.	Date of ending of experiment.	Age of rat at death.	Duration of the experiment.	Weight of rat.		
									Beginning of experiment.	End of experiment.	Gain.
				1915.	1915.	1915.	days.	days.	grams.	grams.	grams.
15	CA	Female	. . .	April 25	May 15	July 6	72	52	24.0	66.5	42.5
	CB	"	. . .	" 25	" 15	" 30	96	76	25.0	103.5	78.5
	EC	"	Thyroid (desiccated)	" 25	" 15	" 6	72	52	19.0	28.5	9.5
	ED	"	"	" 25	" 15	" 30	96	76	24.5	56.5	32.0
16[4]	CA	Female	. . .	April 25	May 15	Aug. 7	104	84	25.5	176.5	125.5
	CB	Male	. . .	" 25	" 15	" 7	104	84	25.5		
	EC	Female	Parathyroid	" 25	" 15	" 7	104	84	25.4	177.0	126.1
	ED	Male	"	" 25	" 15	" 7	104	84	25.5		
17[4]	CA	Male	. . .	May 3	May 21	Aug. 8	97	79	27.5	175.5	119.0
	CB	Female	. . .	" 3	" 21	" 8	97	79	29.0		
	EC	Male	Pineal	" 3	" 21	" 8	97	79	28.0	171.0	113.5
	ED	Female	"	" 3	" 21	" 8	97	79	29.5		
18	CA	Male	. . .	May 9	May 29	July 27	79	59	25.4	66.5	41.1
	CB	"	. . .	" 9	" 29	Aug. 10	93	73	25.4	77.5	52.1
	EC	"	Pituitary (ant. lobe)	" 9	" 29	July 27	79	59	25.0	51.5	26.5
	ED	"	"	" 9	" 29	Aug. 10	93	73	25.7	82.0	56.3
19	CA	Male	. . .	May 10	May 31	Aug. 15	97	76	31.0	172.5	108.1
	CB	"	. . .	" 10	" 31	" 15	97	76	33.4		
	EC	"	Suprarenal	" 10	" 31	" 15	97	76	32.5	168.5	103.0
	ED	"	"	" 10	" 31	" 15	97	76	33.0		
20	CA	Female	. . .	May 10	May 31	Aug. 21	103	82	33.0	83.0	50.0
	CB	"	. . .	" 9	" 31	" 21	104	82	32.0	76.5	44.5
	EC	"	Corpus luteum	" 10	" 31	" 21	103	82	31.8	87.0	55.2
	ED	"	"	" 9	" 31	" 21	104	82	28.0	47.5	19.5
21[4]	CA	Male	. . .	May 19	June 8	Aug. 9	82	62	20.5	84.0	44.1
	CB	"	. . .	" 25	" 14	" 9	76	56	19.4		
	EC	"	Pituitrin	" 19	" 8	" 9	82	62	19.0	90.0	51.0
	ED	"	"	" 25	" 14	" 9	76	56	20.0		

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22	CA	Female	. . .	May 19	June 8	Sept. 4	108	88	19.0	47.0		28.0
	CB	"	. . .	" 29	" 14	" 4	98	82	18.5	53.5		35.0
	EC	"	Thymus (desiccated)	" 19	" 8	" 4	108	88	18.8	64.5		45.7
	ED	"	"	" 29	" 14	" 4	98	82	19.0	65.0		46.0
23	CA	Female	. . .	May 21	June 14	Aug. 28	99	75	15.0	26.0		11.0
	CB	"	. . .	" 21	" 14	Sept. 4	106	82	13.8	50.5		36.7
	EC	"	Salivary	" 21	" 14	Aug. 28	99	75	13.8	39.5		25.7
	ED	"	"	" 21	" 14	Sept. 4	106	82	14.0	57.5		43.5
24	CA	Male	. . .	May 21	June 14	July 10	50	26	12.0	25.0		13.0
	CB	"	. . .	" 21	" 14	" 23	63	39	14.9	46.5		31.6
	EC	"	Testicle	" 21	" 14	" 10	50	26	15.4	29.0		13.6
	ED	"	"	" 21	" 14	" 23	63	39	14.0	81.5		17.5

[a] The experiment was continued a day or two after the supply of glandular material had been exhausted, on the assumption that any effects of the concluding large dosages might *continue* to some extent.

curvatures of the corresponding pairs of incisors were practically the same throughout for each group of rats).

ANALYTIC METHODS APPLIED TO THE INCISOR TEETH.

The four incisor teeth of each rat were crushed in a modified Plattner "diamond" mortar, made of very hard steel and with all adjustable parts fitting together so intimately that no tooth-fragments could be ejected in the process of pulverization. The resultant powder was transferred with all due quantitative precautions to a weighed porcelain crucible and desiccated, at 100–110° C., to *constant weight*. The dry weight of the four incisor teeth of each rat, obtained very accurately in this way, is recorded in Table 4.

The dental powder in each crucible was then thoroughly incinerated to constant weight in a "multiple unit" electric muffle, the temperature of which was the same for the teeth of each group of rats, and approximately the same for all the incinerations. This temperature was always in the range of red, not white, heat, to avoid fusion of the ash. As a rule, the powders were burned for about two hours, then weighed, reburned for another period of two hours, and again weighed to determine whether the expected constancy in mass had been attained. The resultant quantities of ash are recorded in Table 4.

The ash in each crucible was finally treated with 1 per cent. hydrochloric acid solution on a "hot plate." A few drops of concentrated hydrochloric acid solution were also added whenever the ash appeared to resist the solvent action of the dilute acid solution. The acid liquid thus obtained, for the incisor teeth of each rat, was combined with that for the

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TABLE 3. DATA PERTAINING TO THE EXPERIMENTS

Exp. No.	Sex of rats.	Glandular material ingested.	C*	E*						
			grams.	grams.	grams.	grams.				
9	♀	Corpus luteum	138.0	134.0	4.0					
20	♀	" "	159.5	134.5	25.0					
13	♂♀	Lymphatic	226.9	224.0	2.9					
6	♀	Parathyroid	163.5	156.9	6.6					
16	♂♀	"	176.5	177.0		0.5				
7	♂♀♀	Pineal	195.7	152.1[1]	43.6					
17	♂♀	"	175.5	171.0	4.5					
10	♀	Pituitary (ant. lobe)	148.7	143.5	5.2					
18	♂	"	144.0	133.5	10.5					
12	♀	Pituitrin	144.5	118.6	25.9					
21	♂	"	84.0	90.0		6.0				
14	♀	Salivary	161.0	159.5	1.5					
23	♀	"	76.5	97.0		20.5				
2	♂	Spleen	319.7	306.8	12.9					
8	♂	Suprarenal	146.7	147.5		0.8				
19	♂	"	172.5	168.5	4.0					
1	♂	Testicle	259.6	300.5		40.9				
24	♂	"	71.5	60.5	11.0					
3	♂	Thymus	252.7	230.4	22.3					
22	♀	" (desiccated)	100.5	129.5		29.0				
4	♂	Thyroid	129.2	97.4	31.8					
5	♂♀	"	71.5	58.0	13.5					
11	♂♀	" (desiccated)	105.2	112.5		7.3				
15	♀	" (desiccated)	170.0	85.0	85.0					

*C rats are control ones — A(1) and B(2); E rats are "experimental," i.e. *treated*, animals — C(3), D(4), E(5). (See Table 2.)

[1] The ***comparative*** weight for 7 E (pineal) was obtained by taking 2/3 of the weight of the *three* rats involved. (See Table 2.)

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incisor teeth of its sub-group pair; the mixture was then diluted to 100 cc., and bottled in reservation for analysis. A few drops of toluene were added to prevent the growth of micro-organisms.

By analyzing the *combined* solutions of the ash from the incisor teeth of each sub-group *pair* of rats,[7] we ascertained directly the average proportion of calcium in the teeth of the corresponding pair (C or E). This plan of saving time was necessitated by the mechanical difficulty of conducting duplicate analyses on the teeth of all the many rats individually. This course of action was also encouraged by the fact that, as our inferences would have to be based upon the average results for the sub-groups, the individual data would not be needed, and the sub-group average values could appropriately be obtained directly.

Determinations of calcium were made, by the McCrudden method, in 10 or 20 cc. portions of the solutions thus prepared.[8] Each recorded result for calcium content, as given in Table 4, represents the average of closely agreeing duplicate or triplicate results.

ANALYTIC RESULTS AND OTHER DATA.

In the accompanying table (Table 2) we present our data pertaining to the sex, age, weight, and number of the rats; the nature, weight and treatment of the sub-groups of animals in, and the duration of, each experiment and part thereof —all arranged in the sequence of the experiments as inaugurated by us. In Table 3 are summarized the total weights of each sub-group of rats at the end of each corresponding experiment, and their differences; also the total gains in weight for the C and E rats of each experiment, and their differences—all arranged in sections according to the treatment. In Table 4 are given, in extension of the data in Table 2, the weight of the four incisor teeth of each rat in terms of dry weight (total solids), the yield of ash, the content of organic matter and the corresponding percentages of the dry weight; also the percentages of calcium in both the dry teeth (total solids) and their mineral portion (ash), for each sub-group of rats. Table 5 summarizes the weights of the gross analytic portions of the teeth for each sub-group, from the individual data in Table 4, and indicates sub-group differences in mathematical terms and by plus and minus signs. Table 6 shows the differences between the C and E percentages of calcium in the teeth for each experiment, expressed for the dry teeth (total solids) and their mineral portion (ash).

III. Discussion of the Experimental Results.

A general examination of Table 6 reveals the fact that of the 24 "calcium balances" shown under the head of "dry teeth," 17 are on the side of the "control" teeth (C) and 7 on the side of the "experimental" teeth (E); in other words, the dry teeth of 17 groups of the 24 *treated* groups contained less calcium than the dry teeth of the corresponding control animals. If our problem could be solved by the result of such a "popular vote," there would be no need for further reflection.

On the other side of Table 6, under the head of "ash," a similar situation may be noted. Of the 24 "calcium bal-

[7] Trio of rats in the case of the E sub-group in Exp. 7.

[8] McCrudden: *Journal of Biological Chemistry*, 1911, x, p. 187.

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TABLE 4.—DATA PERTAINING TO EFFECTS ON THE WEIGHTS AND GENERAL COMPOSITION OF THE INCISOR TEETH OF THE RATS.
(*See Tables 2, 5 and 6.*)

Exp. No.	Rat.			Teeth.						
	Sub-groups.[1]	Sex.	Glandular material ingested.[2]	Weight.			Per cent. of dry weight.		Calcium.	
				Dry.	Ash.	Organic.	Ash.	Organic.	Per cent. of dry weight.	Per cent. of ash.
				mg.	mg.	mg.	%	%	%	%
1	CA	Male	. . .	243.0	195.9	47.1	80.61	19.39	26.57	32.97
	CB	"		224.6	181.0	43.6	80.59	19.41		
	EC	"	Testicle	171.9	130.9	41.0	76.21	28.79	26.59	34.02
	ED	"	"	241.4	193.9	47.5	80.32	19.68		
2	CA	Male	. . .	169.3	133.2	36.1	78.67	21.33	27.81	35.94
	CB	"	. . .	155.9	118.7	37.2	76.14	23.86		
	EC	"	Spleen	177.0	137.1	39.9	77.45	22.55	27.15	35.56
	ED	"	"	181.9	136.9	45.0	75.25	24.75		
3	CA	Male	. . .	132.8	97.0	35.8	73.04	26.96	25.91	34.18
	CB	"	. . .	159.8	124.8	35.0	78.09	21.91		
	EC	"	Thymus (fresh)	99.0	71.8	27.2	72.52	27.48	26.65	28.54
	ED	"	"	119.7	94.6	25.1	79.03	20.97		
4	CA	Male	. . .	69.8	53.0	16.8	76.21	23.79	26.98	35.11
	CB	"	. . .	68.8	53.5	15.3	77.76	22.24		
	EC	"	Thyroid (fresh)	67.9	48.3	19.6	71.13	28.87	24.36	33.24
	ED	"	"	77.0	57.9	19.1	75.19	24.81		
5	CA	Male	. . .	76.6	51.4	25.2	67.05	32.95	28.04	33.49
	CB	Female		85.6	60.2	25.4	70.33	29.67		
	EC	Male	Thyroid (fresh)	76.9	53.0	23.9	68.92	31.08	20.00	29.43
	ED	Female	"	76.6	51.3	25.3	66.91	33.09		
6	CA	Female	. . .	125.0	97.6	27.4	78.08	21.92	26.61	34.49
	CB	"	. . .	108.2	82.3	25.9	76.06	23.94		
	EC	"	Parathyroid	127.1	94.3	32.8	74.19	25.81	26.31	34.64
	ED	"	"	116.3	90.5	25.8	77.81	22.19		

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7	CA	Female	. . .	98.9	75.5	23.4	76.34	23.66	26.97	35.48
	CB	Male	. . .	156.3	118.5	37.8	75.43	24.57		
	EC	Female	Pineal	112.4	86.0	26.4	76.51	23.49	26.26	34.58
	ED	Male	"	124.2	96.6	27.6	77.78	22.22		
	EE	Female	"	101.9	74.5	27.4	73.11	26.89		
8	CA	Male	. . .	100.8	75.6	25.2	75.00	25.00	26.23	34.99
	CB	"	. . .	107.0	80.2	26.8	74.95	25.05		
	EC	"	Suprarenal	111.0	83.1	27.9	74.86	25.14	27.29	36.31
	ED	"	"	97.6	73.7	23.9	75.51	24.49		
9	CA	Female	. . .	78.6	59.3	19.3	75.44	24.56	26.58	35.15
	CB	"	. . .	87.2	66.1	21.1	75.80	24.20		
	EC	"	Corpus luteum	86.8	67.9	18.9	78.22	21.78	26.76	34.85
	ED	"	"	77.5	58.3	19.2	75.22	24.78		
10	CA	Female	. . .	102.6	79.1	23.5	77.09	22.91	26.19	34.15
	CB	"	. . .	122.3	93.4	28.9	76.37	23.63		
	EC	"	Pituitary (ant. lobe)	116.3	87.3	29.0	75.06	24.94	25.89	33.89
	ED	"	"	107.8	83.6	24.2	77.55	22.45		
11	CA	Male	. . .	92.4	67.8	24.6	73.37	26.63	28.58	40.07
	CB	Female	. . .	95.1	65.9	29.2	68.24	31.76		
	EC	Male	Thyroid (desiccated)	99.8	77.0	22.8	77.15	22.85	26.79	35.84
	ED	Female	"	100.6	72.8	27.8	72.33	27.67		
12	CA	Female	. . .	150.3	105.3	45.0	70.06	29.94	22.67	32.26
	CB	"	. . .	127.1	89.7	37.4	70.57	29.43		
	EC	"	Pituitrin	129.7	89.9	39.8	69.31	30.69	21.40	31.78
	ED	"	"	120.3	81.6	38.7	67.88	32.17		
13	CA	Male	. . .	144.1	100.3	43.8	69.60	30.40	23.18	33.66
	CB	Female	. . .	133.7	91.0	42.7	68.06	31.94		
	EC	Male	Lymphatic	154.3	108.3	46.0	70.19	29.81	19.24	28.18
	ED	Female	"	118.6	78.0	40.6	65.77	34.23		
14	CA	Female	. .	92.0	61.6	30.4	66.96	33.04	23.54	34.21
	CB	"		117.3	82.4	34.9	70.25	29.75		
	EC	"	Salivary	82.1	54.3	27.8	66.14	33.86	21.73	32.21
	ED	"	"	119.0	81.3	37.7	68.32	31.68		

[1] C rats are "control" ones; E rats are "experimental," i.e. *treated,* animals.

[2] See summary of details regarding glandular materials used, page 165.

[*Cont. overleaf.*

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TABLE 4.—DATA PERTAINING TO EFFECTS ON THE WEIGHTS AND GENERAL COMPOSITION OF THE INCISOR TEETH OF THE RATS—(*Continued*).
(*See Tables 2, 5 and 6.*)

Exp. No.	Rat.			Teeth.						
				Weight.			Per cent. of dry weight.		Calcium.	
	Sub-groups.	Sex.	Glandular material ingested.	Dry.	Ash.	Organic.	Ash.	Organic.	Per cent. of dry weight.	Per cent. of ash.
				mg.	mg.	mg.	%	%	%	%
15	CA	Female	. . .	93.5	60.6	32.9	64.75	35.25	25.67	37.86
	CB	"	. . .	143.0	99.2	43.8	69.37	30.63		
	EC	"	Thyroid (desiccated)	82.1	52.7	29.4	64.19	35.81	25.48	38.90
	ED	"	"	100.5	66.9	33.6	66.57	33.43		
16	CA	Female	. . .	127.7	89.0	38.7	69.69	30.31	24.00	35.08
	CB	Male	. . .	105.9	70.8	35.1	66.86	33.14		
	EC	Female	Parathyroid	105.7	72.2	33.5	68.31	31.69	23.54	34.79
	ED	Male	"	106.7	71.5	35.2	67.01	32.99		
17	CA	Male	. . .	109.9	75.3	34.6	68.52	31.48	25.05	36.64
	CB	Female	. . .	116.4	79.4	37.0	68.21	31.79		
	EC	Male	Pineal	109.1	74.6	34.5	68.38	31.62	22.89	33.54
	ED	Female	"	107.6	73.3	34.3	68.12	31.88		
18	CA	Male	. . .	104.0	68.4	35.6	65.77	34.23	25.36	38.31
	CB	"	. . .	107.8	71.8	36.0	66.60	33.40		
	EC	"	Pituitary (ant. lobe)	88.5	58.6	34.9	60.56	39.44	25.12	38.13
	ED	"	"	109.9	77.1	32.8	70.15	29.85		
19	CA	Male	. . .	115.6	77.9	37.7	67.39	32.61	25.99	38.82
	CB	"	. . .	105.3	70.0	35.3	66.48	33.52		
	EC	"	Suprarenal	116.8	76.8	40.0	65.75	34.25	24.36	37.09
	ED	"	"	101.6	66.7	34.9	65.65	34.35		
20	CA	Female	. . .	122.0	84.0	38.0	68.85	31.15	24.09	34.22
	CB	"	. . .	120.5	86.7	33.8	71.95	28.05		
	EC	"	Corpus luteum	130.7	92.2	38.5	70.54	29.46	24.25	34.82
	ED	"	"	106.1	72.7	33.4	68.52	31.48		
21	CA	Male	. . .	88.2	57.8	30.4	65.85	34.15	23.21	35.66
	CB	"	. .	93.6	60.5	33.1	64.64	35.36		
	EC	"	Pituitrin	93.6	61.2	32.4	65.38	34.62	25.67	37.98
	ED	"	"	110.8	77.1	33.7	69.58	30.42		

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22	CA	Female	. . .	119.9	79.8	40.1	66.56	33.44	25.06	37.14		
	CB	"	. . .	95.9	65.8	30.1	68.61	31.39				
	EC	"	. . .	111.0	77.9	33.1	70.19	29.81	23.61	34.03		
	ED	"	Thymus (desiccated)	108.9	71.2	32.7	68.53	31.47				
23	CA	Female	. . .	101.4	69.7	31.7	68.74	31.26	25.07	36.40		
	CB	"	. . .	114.8	79.5	35.3	69.43	30.57				
	EC	"	Salivary	114.0	79.4	34.6	69.65	30.85	23.06	33.38		
	ED	"	"	98.5	67.4	31.1	68.43	31.57				
24	CA	Male	. . .	67.0	45.0	22.0	67.16	32.84	20.86	31.20		
	CB	"	. . .	74.2	49.4	24.8	66.58	33.42				
	EC	"	Testicle	59.4	38.8	20.6	65.32	34.68	22.33	34.10		
	ED	"	"	76.4	50.1	26.3	65.58	34.42				

ances" there, 17 are on the side of the "control" teeth (C) and 7 on the side of the "experimental" teeth (E); that is to say, the mineral portion of the teeth of 17 of the 24 *treated* groups (E) contained less calcium than that of the teeth of the corresponding "control" animals. Briefly, then, the gross differences in Table 6 suggest, superficially at least, that, in general, the dosage caused, or was followed by, impaired or subnormal calcification of the teeth in the anabolic sense, or decalcification in the active abnormal catabolic sense, or both.

If we call up the friend of every statistician, "general average," and obtain his verdict, we learn that the average surplus of calcium (Table 6), for the 17 cases in which the control *dry* teeth (C) contained more calcium than that in the dry teeth of the corresponding treated rats (E), is 1.45 per cent.; for the *dry* teeth of the 7 experimental groups (E), with plus calcium differences, it is 0.87 per cent. For the 24 groups there is an average gross surplus of calcium for C teeth over E teeth amounting to 0.77 per cent., or an average *deficiency* of this proportion of calcium in the *dry* teeth of the treated rats—a general result in harmony with the foregoing deduction in this connection.

Again, the average surplus of calcium, for the 17 cases in which the mineral portion (ash) for the control teeth (C) contained more calcium than that in the ash from the teeth of the corresponding treated rats (E), is 2.18 per cent.; for the ash from the teeth of the 7 treated groups (E), with plus calcium differences, it is 1.33 per cent. For the 24 groups, there is an average gross surplus of calcium for C teeth over E teeth amounting to 1.15 per cent., or an average *deficiency* of calcium to this e

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TABLE 5.—DATA PERTAINING TO EFFECTS ON THE TOTAL WEIGHTS OF THE VARIOUS ANALYTIC PORTIONS OF THE TEETH, FOR EACH SUB-GROUP OF RATS. (*See Table 4.*)

Experiment No.	Sex of rats.	Glandular material ingested.[1]	Rat sub-group.[2]	Total weights of tooth portions.			Balances: C > E signified by +, E > C signified by −		
				Dry. (Total solids.)	Ash.	Organic matter.	Dry. (Total solids.)	Ash.	Organic matter.
				mg.	mg.	mg.			
9	♀	Corpus luteum	C	165.8	125.4	40.4			
			E	164.3	126.2	38.1			
			diff.	1.5	—0.8	2.3	+	−	+
20	♀	Corpus luteum	C	242.5	170.7	71.8			
			E	236.8	164.9	71.9			
			diff.	5.7	5.8	—0.1	+	+	−
13	♂♀	Lymphatic	C	277.8	191.3	86.5			
			E	272.9	186.3	86.6			
			diff.	4.9	5.0	—0.1	+	+	−
6	♀	Parathyroid	C	233.2	179.9	53.3			
			E	243.4	184.8	58.6			
			diff.	—10.2	—4.9	—5.3	−	−	−
16	♂♀	Parathyroid	C	233.6	159.8	73.8			
			E	212.4	143.7	68.7			
			diff.	21.2	16.1	5.1	+	+	+
7	♂♀	Pineal	C	255.2	194.0	61.2			
			E[3]	225.6	171.4	54.2			
			diff.	29.6	22.6	7.0	+	+	+
17	♂♀	Pineal	C	226.3	154.7	71.6			
			E	216.7	147.9	68.8			
			diff.	9.6	6.8	2.8	+	+	+
10	♀	Pituitary (*ant.* lobe)	C	224.9	172.5	52.4			
			E	224.1	170.9	53.2			
			diff.	0.8	1.6	—0.8	+	+	−
18	♂	Pituitary (*ant.* lobe)	C	211.8	140.2	71.6			
			E	198.4	130.7	67.7			
			diff.	13.4	9.5	3.9	+	+	+
12	♀	Pituitrin (*post.* lobe)	C	277.4	195.0	82.4			
			E	250.0	171.5	78.5			
			diff.	27.4	23.5	3.9	+	+	+

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21	♂	Pituitrin (*post.* lobe)	C	181.8	118.3	63.5			
			E	204.4	188.3	66.1			
			diff.	—22.6	—20.0	—2.6	−	−	−
14	♀	Salivary	C	209.8	144.0	65.3			
			E	201.1	135.6	65.5			
			diff.	8.2	8.4	—0.2	+	+	−
28	♀	Salivary	C	216.2	149.2	67.0			
			E	212.5	146.8	65.7			
			diff.	3.7	2.4	1.3	+	+	+
2	♂	Spleen	C	325.2	251.9	73.3			
			E	358.9	274.0	84.9			
			diff.	—33.7	—22.1	—11.6	−	−	−
8	♂	Suprarenal	C	207.8	155.8	52.0			
			E	208.6	156.8	51.8			
			diff.	—0.8	—1.0	0.2	−	−	+
19	♂	Suprarenal	C	220.9	147.9	73.0			
			E	218.4	148.5	74.9			
			diff.	2.5	4.4	—1.9	+	+	−
1	♂	Testicle	C	467.6	376.9	90.7			
			E	413.3	324.8	88.5			
			diff.	54.3	52.1	2.2	+	+	+
24	♂	Testicle	C	141.2	94.4	46.8			
			E	135.8	88.9	46.9			
			diff.	5.4	5.5	—0.1	+	+	−
3	♂	Thymus (fresh)	C	292.6	221.8	70.8			
			E	218.7	166.4	52.3			
			diff.	73.9	55.4	18.5	+	+	+
22	♀	Thymus (desiccated)	C	215.8	145.6	70.2			
			E	214.9	149.1	65.8			
			diff.	0.9	—3.5	4.4	+	−	+
4	♂	Thyroid fresh)	C	138.6	106.5	32.1			
			E	144.9	106.2	38.7			
			diff.	—6.3	0.3	—6.6	−	+	−
5	♂♀	Thyroid (fresh)	C	162.2	111.6	50.6			
			E	153.5	104.3	49.2			
			diff.	8.7	7.3	1.4	+	+	+
11	♂♀	Thyroid (desiccated)	C	187.5	133.7	53.8			
			E	200.4	149.8	50.6			
			diff.	—12.9	—16.1	3.2	−	−	+
15	♀	Thyroid (desiccated)	C	236.5	159.8	76.7			
			E	182.6	119.6	63.0			
			diff.	53.9	40.2	13.7	+	+	+

[1] See summary of details regarding glandular materials used, page 165.
[2] C rats are "control" ones; E rats are "experimental," i.e. *treated*, animals.
[3] Two-thirds of the totals for the three E rats are recorded in this comparison. (See Table 4.)

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TABLE 6.—DATA PERTAINING TO COMPARATIVE EFFECTS ON "CALCIUM BALANCES" IN THE COMPOSITION OF THE TEETH FOR EACH SUB-GROUP OF RATS. (*See Table 4.*)

Exp. No.	Sex in each sub-group.	Number of rats in each sub-group.		Percentage of calcium in the teeth.							
				Dry teeth.				Ash.			
						Difference.				Difference.	
		C*	E*	C*	E*	C > E	E > C	C*	E*	C > E	E > C
Corpus luteum.											
9	♀	2	2	26.58	26.76	. .	0.18	35.15	34.85	0.30	. .
20	♀	2	2	24.09	24.25	. .	0.16	34.22	34.82	. .	0.60
Lymphatic gland.											
18	♂♀	2	2	23.18	19.24	3.94	. .	33.66	28.18	5.48	. .
Parathyroid gland.											
6	♀	2	2	26.61	26.31	0.30	. .	34.49	34.64	. .	0.15
16	♂♀	2	2	24.00	23.54	0.46	. .	35.08	34.79	0.29	. .
Pineal gland.											
7	♂♀	2	3	26.97	26.26	0.71	. .	35.48	34.58	0.90	. .
17	♂♀	2	2	25.05	22.89	2.16	. .	36.64	33.54	3.10	. .
Pituitary gland (anterior lobe).											
10	♀	2	2	26.19	25.89	0.30	. .	34.15	33.89	0.26	. .
18	♂	2	2	25.36	25.12	0.24	. .	38.31	38.13	0.18	. .
Pituitrin (posterior lobe).											
12	♀	2	2	22.67	21.40	1.27	. .	32.26	31.78	0.48	. .
21	♂	2	2	23.21	25.67	. .	2.46	35.66	37.93	. .	2.27

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Salivary gland.

14	♀	2	2	28.54	21.78	1.81	. .	84.21	82.21	2.00	. .
23	♀	2	2	25.07	23.06	2.01	. .	86.40	83.38	3.02	. .

Spleen.

2	♂	2	2	27.81	27.15	0.66	. .	85.94	35.56	0.38	. .

Suprarenal gland.

8	♂	2	2	26.23	27.29	. .	1.06	34.99	36.31	. .	1.32
19	♂	2	2	25.99	24.36	1.63	. .	38.82	37.09	1.78	. .

Testicle.

1	♂	2	2	26.57	26.59	. .	0.02	32.97	34.02	. .	1.05
24	♂	2	2	20.86	22.33	. .	1.47	31.20	34.10	. .	2.90

Thymus gland.

(3, fresh; 22, desiccated).

3	♂♀	2	2	25.91	26.65	. .	0.74	34.18	28.54	5.64	. .
22	♂♀	2	2	25.06	28.61	1.45	. .	37.14	34.03	3.11	. .

Thyroid gland.

(4 and 5, fresh; 11 and 15, desiccated).

4	♂♀	2	2	26.98	24.36	2.62	. .	35.11	33.24	1.87	. .
5	♂♀	2	2	23.04	20.00	3.04	. .	33.49	29.43	4.06	. .
11	♂♀	2	2	28.58	26.79	1.79	. .	40.07	35.84	4.23	. .
15	♂♀	2	2	25.67	25.48	0.19	. .	37.86	38.90	. .	1.04

*C rats are "control" ones; E rats are "experimental," i.e. *treated*, animals.

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in the mineral portion of the teeth of the treated rats. These facts afford further support for the general inference stated above.

If, instead of relying upon "majority vote" or "general average," we study individual peculiarities, we note the agreements and disagreements among the plus calcium balances (sub-groups) for dry teeth (total solids), and their mineral portions (ash), that are shown in the appended summary of direct comparisons (Table 6):

single balances might have, where the balances are not intrinsically too small to signify anything in particular in the first place. Thus, it is impossible to believe, from the results for proportion of calcium in the dry teeth (total solids), that pituitrin, suprarenal, and thymus had any influence on calcification—the differences among the balances negative any such faith. It is also impossible to infer, from the results for proportion of calcium in the mineral portion (ash) of the teeth, that corpus luteum, parathyroid,

C > E. Dry: Lymphatic, parathyroid, pineal, pituitary (ant.), salivary, spleen, thyroid (4 : 0), —0—.
Ash: Lymphatic, —0— , pineal, pituitary (ant.), salivary, spleen, thyroid (3 : 1), thymus.
E > C. Dry: Corpus luteum, testicle.
Ash: —0— , testicle.
E ± C. Dry: —0 — , —0— , pituitrin (post.), suprarenal, thymus.
Ash: Corpus luteum, parathyroid, pituitrin (post.), suprarenal, —0—.

We see, from the facts in this summary, excluding consideration of the results for lymphatic gland and spleen (since only one experiment was conducted with each of these), that, of the remaining ten sets of experiments, four (with pineal, pituitary—anterior lobe, salivary, and thyroid glands) agree in the indication that degree of calcification was *reduced* by, or in association with, the treatment, in both the dry (total solids) and mineral portions (ash) of the incisor teeth in every experiment except one of the ten with these glandular materials. In only one case was there similar agreement in favor of the inference that degree of calcification was *increased* by, or in association with, the treatment, in both the dry (total solid) and mineral (ash) portions of the teeth, *i.e.* in the case of each experiment with testicle.

The disparities in this connection, among the other five groups of *plus* "calcium balances," (E ± C), nullify any present significance that any of their pituitrin, and suprarenal had any effect on calcification—the lack of concordance among the balances makes such an inference untenable.

If we conclude, as was suggested above, that calcification of the teeth was *reduced,* from the standpoint of content of calcium in the dry teeth and in their ash, by, or in association with, the treatment with pineal, pituitary—anterior lobe, salivary, and thyroid glands, and that calcification was *increased* by, or in association with, the treatment with testicle, we ascribe, we believe, the most that may positively be credited to the data at hand in this connection. We believe, however, that the differences for pituitary—anterior lobe—are too slight to mean anything and are merely a coincidence. They look too much like those for parathyroid to deserve any special attention. One of the plus "calcium balances" for testicle is so small as to arouse suspicion regarding its significance.

At most, then, we conclude, in this

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connection, that possibly the treatment with glandular material was directly or indirectly responsible for effects on calcification in the teeth in some of the experiments—*decrease* induced by the pineal, salivary, and thyroid glands; *increase* caused by testicle.

An examination of Table 3 affords food for further reflection. The rats of the control sub-groups (C), in 17 cases of the 24, were *heavier* than those of the experimental sub-groups (E). In all these cases, besides, and also in one more (18 out of 24), the control rats (C) *gained* more than did the experimental animals (E). Possibly the preponderance in the number of plus "calcium balances" for the teeth of the control animals (C), as recorded in Table 6, was connected, in these rats, with more perfect nutrition than that in the experimental rats (E). Our dosage of the latter rats might have impaired general nutrition appreciably, and thus affected the teeth in a general rather than in a specific way.

That there were no material effects of the treatment on the dimensions and the curvature of the teeth was stated in the description of methods. That the weight of dry tooth (total solids), of organic matter, and of mineral constituents (ash) was not significantly affected by the dosage may be seen from the data in Table 5.

The data in Table 5 show that, in 18 cases of the 24, the weights of the dry control teeth (C) were greater than the corresponding weights for the treated animals (E); that in 14 cases of the 24, the weights of the organic portion in the control teeth (C) were greater than the corresponding weights for the treated rats (E); and that in 17 cases of the 24, the weights of the ash from the control teeth (C) were greater than the corresponding weights for the "experimental" rats (E). In 10 of the 24 cases, the weights of these three portions of the control teeth were greater, respectively, than the corresponding weights for the treated rats. In only 3 cases of the 24 were all these weights greater for the teeth of the treated rats than for the teeth of the control ones. In the case of only one kind of treatment—with pineal gland—was there unanimous agreement among all the signs for the differences on these three items, for the teeth of the control and treated rats in the experimental group; *i.e.*, there were only plus balances for the pineal treatment. This result agrees with the previous indication for effects of treatment with pineal gland. There was practical unanimity among the "balance signs" for effects of the treatments with pituitary, salivary, testicle, and thymus—all plus balances except one in each group. On the basis of our previous standards for comparison, two of these treatments—salivary and testicle—appeared to have been influential; the other two, pituitary and thymus, seem to have had no definite effect. The signs of the weight balances in Table 5, in the case of the testicle experiment, should be *minus,* however, to accord with the indication of increased calcification due to that treatment, as previously considered. The signs for the suprarenal treatment were the only ones that were practically unanimous on the minus, $E > C$, side.

A study of the relative positions of the plus and minus signs, in Table 5, in all these connections, indicates strongly, however, that there was no effect on the masses and general composition of the teeth that can be regarded at present as particularly significant, despite the

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Exp. No.	Rat sub-group.	Experiment ended: date.	Duration of experiment: days.	Age of rat at death: days.	Weight of rats. Beginning of experiment. grams.	End of experiment. grams.	Gain. grams.	Teeth. Weight. Dry. mg.	Ash. mg.	Ash: Per cent. of dry teeth. %	Calcium. Per cent. of dry teeth. %	Per cent. of ash. %
					Females. Salivary gland.							
23	CA	8/28	75	99	15.0	26.0	11.0	101.4	69.7	68.74		
	CB	9/4	82	106	13.8	50.5	36.7	114.8	79.5	69.43		
	Sub-group average: C				**14.4**	**38.2**	**23.8**	**108.1**	**74.6**	**69.08**	**25.07**	**36.40**
	EC	8/28	75	99	13.8	39.5	25.7	114.0	79.4	69.65		
	ED	9/4	82	106	14.0	57.5	43.5	98.5	67.4	68.43		
	Sub-group average: E				**13.9**	**48.5**	**34.6**	**106.2**	**73.4**	**69.04**	**23.06**	**33.38**
					Males. Testicle.							
24	CA	7/10	26	50	12.0	25.0	13.0	67.0	45.0	67.16		
	CB	7/23	39	63	14.9	46.5	31.6	74.2	49.4	66.58		
	Sub-group average: C				**13.4**	**35.7**	**22.3**	**70.6**	**47.2**	**66.87**	**20.86**	**31.20**
	EC	7/10	26	50	15.4	29.0	13.6	59.4	38.8	65.32		
	ED	7/23	39	63	14.0	31.5	17.5	76.4	50.1	65.58		
	Sub-group average: E				**14.7**	**30.2**	**15.5**	**67.9**	**44.4**	**65.45**	**22.33**	**34.10**

Record of body-weights: Experiments 23 and 24 (grams).

			Beginning of experiment.	Duration of experiment: weeks. 1	2	3	4	5	6	7	8	9	10	11
23	C	. .	28.8	32.5	39.7	50.0	59.5	70.0	71.5	75.5	73.5[2]	83.0	79.0	76.0
	E	(Salivary)	27.8	32.8	39.8	50.4	59.5	69.5	78.5	76.0	75.5	83.0	89.5	96.0
24	C	. . .	26.9	35.2	40 0	47.2	63.0	48.0[3]	46.5					
	E	(Testicle)	29.4	37.5	45.5	54.0	60.0	34.5[3]	31.5[4]					

[1] The rats were born on May 21, '15. The experiments were started on June 14, '15. (See Tables 2 and 4.)
[2] One of the pair was growing more slowly than the other. Continued so to the end.
[3] One of each pair only.
[4] Paralytic: dead. (See "quotations from protocols.")

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fact that the large preponderance in the number of plus "weight-balances" in favor of the control teeth suggests, in harmony with the general conclusion from the previous comparisons already discussed, that the glandular dosage caused, or was accompanied by, impairment of or interference with normal calcification in the teeth of the treated animals.

A fact that may prove to be of more significance than can now be ascribed to it, is the disagreement between the figures for percentage of calcium in the teeth of the groups of rats treated respectively with salivary gland (Exp. 23) and testicle (Exp. 24), although all the rats in both groups were members of the same litter (Table 6; see also the "quotations from the protocols"). In these experiments (23, 24), as in the two previous ones with these glandular materials —14 (salivary) and 1 (testicle)—the teeth of the treated animals (E) in the experiment with salivary gland contained less calcium, in the experiment with testicle they contained more calcium, than that in the teeth of the corresponding control rats (C). The significant data in this and other relations for these two experiments are assembled in Table 7.

Although there was a higher degree of calcification in the teeth of the treated animals as compared with the teeth of the control animals in the testicle experiment, and *vice versa* in the salivary experiment, there was no discernible effect, in either experiment, on the gross weights of the dry teeth, nor on their yield of ash, nor on the percentage of ash in the dry teeth, in spite of the nutritive disturbances in each experiment that are referred to in the "quotations from the protocols," and regardless of the inequality in the average gains in body-weight per sub-group.

These comparisons cannot be entirely satisfactory, however, because the two groups of animals were not of the same sex, and also because the experiments were of markedly unequal length, the corresponding teeth being of unequal age and development.[9] The proportion of calcium in the older rats (23) is uniformly larger than that in the younger rats (24), but possibly this difference is due primarily to the sexual unlikeness. Experiments similar to Exp. 23 and 24, but directly comparable in all respects, will be conducted for the purpose of fully testing the suggestions afforded by the results in Table 7.

Throughout the discussion of our data, we have restrained all inclination to attach undue significance to the *concordances* among our results, for, although every instance of such agreement happens to support the belief on which these studies are proceeding, we prefer to underrate the *apparent* value of our findings rather than ascribe to them an import or an importance that repetition would deny them.

Many additional details might be brought forward, from the mass of data, for further discussion, such as the relation of the age of the animals to the results, but we feel that such further considerations would not be profitable at this time.

In spite of a serious as well as strenuous effort to find clear leads from the results of a comparatively large number of

[9] These two experiments (23, 24) were not intended to be directly comparative, however, other more urgent considerations requiring attention when the experiments were started.

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experiments, we are obliged to infer that our results are suggestive, primarily, of the probable advantage of repetition and extension of this work.

We propose not only to repeat and extend the series of experiments described, but also to follow collateral lines of importance in this connection bearing on the interpretation of data such as we have presented here.

We shall aim especially to ascertain, in parallel tests, the *normal variations* in the composition of the teeth of rats in groups of four and divided arbitrarily into pairs, neither pair in such a group to be "treated," and both in each group to be, in effect, "control" pairs. Possibly there is a wider range of normal variation in the dentition of healthy normal rats than we have presumed—a range of variation wide enough, perhaps, to include all the differences among the "calcium balances" in the accompanying tables. Such possibilities are always much more clearly discerned at the end of an investigation like this than at its beginning.

We shall also plan to include along collateral lines, in the extension of this work, appropriate experiments on the influence of substances and conditions that impair or enhance *general nutrition*.

These and related types of studies, with repetitions and extensions of the experiments herein described, may be expected to afford clearer indications of the truth on this subject than can be discerned in the foregoing data.

IV. Summary of General Conclusions.

Feeding experiments (24) of extended duration (20–99 days), with glandular tissues, preparations and extracts (12 kinds), on white rats (97), yielded results which suggest that possibly the proportions of calcium in both the dry (total solid) and mineral (ash) portions of the incisor teeth were *decreased* by some of the treatments—pineal gland, salivary gland, and thyroid gland, particularly—and *increased* by treatment with testicle. (Table 6.)

A general tendency to decreased proportionate content of calcium in the teeth of the treated rats was concomitant with general diminution of growth rate, and with smaller gross gain in weight by the end of the experiments. (Table 3.)

There were no definite effects on the dimensions, curvature, or weights (total solids, organic matter, ash) of the incisor teeth that could be ascribed directly to the glandular treatment; although, in accord with the prevailing preponderance in body-weight of the control rats, the teeth of the control rats were somewhat heavier, in the main, than those of the "treated" animals. (Table 5.)

The results are regarded as suggestive, not as conclusive. The experiments will be repeated and extended.

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Studies of the Influence of Unbalanced Diets on Dentition.

By WILLIAM J. GIES and COLLABORATORS.

(*From the Biochemical Laboratory of Columbia University, at the College of Physicians and Surgeons, New York.*)

1. On the General Influence of Dietary Conditions and Other Nutritional Factors on the Development and State of the Teeth.

By WILLIAM J. GIES, Ph.D., Sc.D., New York, N. Y.,
PROFESSOR OF BIOLOGICAL CHEMISTRY, COLUMBIA UNIVERSITY.

(BEING the second section[1] of the *fifth* annual report, by William J. Gies and collaborators, on investigations under the auspices of the Research Committee of the Dental Society of the State of New York, Dr. Wm. B. Dunning, chairman; and the second section of the *first* annual report on investigations under the auspices of the Scientific Foundation and Research Commission of the National Dental Association, Dr. Weston A. Price, chairman.)

ORGANISMS consist of cells and cell-products in structural and functional relationships. The cellular units of biologic structure are composed of specific substances in particular adjustments. Nearly all the *intra*cellular substances are directly or indirectly obtained by animals, at every stage of their development, from mixed diets consisting of *parts of previously living organisms.* We eat what we do because we are composed as we are. We are *nourished* by food containing adequate proportions of animal or vegetable matter, or both, *i.e.* cellular matter, but we could not survive on a diet from which materials of protoplasmic origin were wholly and continuously excluded. We are very different from plants in this respect. We could not subsist, for a prolonged period, on a strictly *mineral* diet, especially because our cells could not produce, from a purely mineral diet, such *essential* intracellular substances as enzymes and proteins in the vital organs, new supplies of which constituents are continuously needed for the maintenance of functional effectiveness (repair) in the most

[1] The first section of this report precedes this paper. See *Transactions of the Dental Society of the State of New York*, 1915, p. 161. The third section of this report follows this paper: *Ibid.*, p. 192.

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important parts of the body. On the other hand, a diet of purely *organic* material would not suffice for growth or normal maintenance, because some of the mineral elements in protoplasm are essential to the continuance of intracellular activity; and none of these mineral elements is obtainable from organic nutrients alone. None of the tissues, including teeth and bone, develops normally on diets that are continuously deficient in capacity to yield adequate proportions of the essential protoplasmic radicals to the cells involved in tissue construction.

The substances in each part of a tooth, also all the parts of a tooth and all the teeth in a pair of normal jaws, are structurally and functionally adjusted to each other. The perfection of normal dental alinement and occlusion are striking instances of the high degree of co-ordination that is both physically and chemically attainable in organisms. All normal tissues are chemically and mechanically co-ordinated, internally and externally. It is a matter of particular dental importance to determine precisely what influences are involved in the mobilization of the substances in the teeth—what forces effect the translocation, assemblage, and correlation of the dental constituents.

We develop the various parts of our bodies at the expense of materials derived from other organisms—but we do not eat teeth. We reject teeth as wholly unsuitable in a diet. Teeth are evidently formed from substances in the diet that are derived neither from teeth nor from any similar kind of tissue. Teeth and bones are unique structures, in which substances of unrelated derivation, particularly mineral matters, are concentrated and co-ordinated. Teeth consist of large proportions of mineral ingredients and small proportions of organic substances. Enamel is almost wholly mineral in chemical quality. There is no evidence, however, that the organic substances in each of the parts of a tooth —even in enamel—are not structurally essential, or that the teeth can develop fully and remain normal on a diet that is continuously deficient in *any* respect.

It is obvious that ingredients of the diet, both mineral and organic (modified or unchanged), find their way into the structure of teeth. It is equally plain that neither the mineral nor the organic constituents of the diet co-ordinate *themselves* into enamel and dentin. There is no team-play among the nutrients on their own signals, so to speak—they proceed where they are *directed* metabolically to go! Suitable proportions of each nutrient are selected, assorted, distributed, alined, deposited, fixed, in conformity with definite "plans" for both development and maintenance, by the co-ordinative influences in the cells that produce the parts of the teeth. Mere presence of such constituents in the alimentary tract or in the blood, or abundance of their local cellular supply, is not sufficient to insure their correlated utilization in dental development; for, if the cellular *building forces* are not *co-ordinately operative,* normal dental construction cannot occur.

The "building forces" that are "co-ordinately operative," in the development and maintenance of teeth and other tissues, are the *intra*cellular processes by which construction is directly effected. But these *intra*cellular constructive processes are under the control of, or are dependent upon, at least four kinds of factors of *extra*cellular origin, viz, (a) available *nutrients* (quality and quan-

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tity), (b) *nervous influences,* (c) chemical substances from ductless glands (*internal secretions*), and (d) *toxic materials* of extra-corporeal, alimentary, parasitic, or metabolic derivation, or all of these.

If we agree that the development and maintenance of the teeth and other tissues are due to certain (1) *intra*cellular constructive operations under co-ordinative control, or subject to correlative modification, by the (2) supply of nutrients, by (3) nervous influences, by (4) chemical "directors" of glandular origin, and by (5) poisons (toxins) of diverse derivation, we shall have to concede, also, that dentition must be completely understood from the standpoints of the functions of these factors, individually and collectively, before dentition can be fully comprehended, either as a process or as a result.

The preceding paper[2] presented the results of the second phase of our continued inquiry into the possible influences on dentition of "chemical directors" dispatched from organs of internal secretion to the cells involved in dental development. . In succeeding reports we hope to present results of studies of effects, on dentition, of nervous influences and of toxic substances.

In the series of papers of which this is the introduction, we expect to present and discuss the results of studies of the relation between diet (nutrition) and dentition. It is hoped that ultimately, at the conclusion of all these several lines of independent though related studies, we shall be able to discuss effectively the nature and control of the essential processes involved in the development of the teeth, in the maintenance of dental normality, and in the incidence of different types of dental pathology.

In the succeeding paper, the second of this series,[3] we consider the influence of deficient diets and of treatment internally with organic and mineral acids, with special reference to the significance of the results in the interpretation of past and future data on the dental effects (if any) of internal secretions.

[In addition to presenting orally the substance of the foregoing comment, the author discussed, in this relation, the (1) results of some of his preliminary experiments on the passage of trypan blue from the pulp to the enamel and (2) his observations on the passage of water back and forth through enamel. The results referred to will be published in detail after the completion of the experiments in these connections that are now in progress.]

[2] See footnote 1.

[3] See footnote 1.

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Studies of the Influence of Unbalanced Diets on Dentition.

By WILLIAM J. GIES and COLLABORATORS.

(*From the Biochemical Laboratory of Columbia University, at the College of Physicians and Surgeons, New York.*)

2. A Chemical Study of Nutritive Factors in the Development of Teeth and Bones, with Special Reference to the Influence of Hydrochloric and β-Hydroxybutyric Acids, and the Effects of Dietary Deficiencies of Calcium and Phosphorus.[1]

By WILLIAM A. PERLZWEIG, M.A., Ph.D., New York City,
ASSISTANT IN BIOLOGICAL CHEMISTRY, COLUMBIA UNIVERSITY.

(BEING the third section[2] of the *fifth* annual report, by William J. Gies and collaborators, on investigations under the auspices of the Research Committee of the Dental Society of the State of New York, Dr. Wm. B. Dunning, chairman; and the third section of the *first* annual report on investigations under the auspices of the Scientific Foundation and Research Commission of the National Dental Association, Dr. Weston A. Price, chairman.)

I. Introduction.

During the early progress, in this laboratory, of the "studies of internal secretions in their relation to the development and condition of the teeth,"[3] it was recognized that the influences of internal secretions might be masked by purely dietary consequences, and that dietary anomalies might induce results that would be mistaken for the effects of internal secretions.

Thus, at one point in our discussion, it was said:

> The loss of weight in practically all the operated animals is a matter that requires, and will receive, special attention in our future experiments in this particular connection—involving, as it may, tissue deficiency in calcium (and other constituents) *from loss*

[1] Accepted by the Executive Officer of the Department of Biological Chemistry of Columbia University as a dissertation submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in the Faculty of Pure Science, Columbia University, October 1915.

[2] The second section of the report precedes this paper. Gies: *Transactions of the Dental Society of the State of New York*, 1915, p. 189.

[3] Gies and collaborators. 1. Gies, Morgulis, and Perlzweig: *Dental Cosmos*, 1915, lvii, p. 276; *Transactions of the Dental Society of the State of New York*, 1914, p. 105.

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of appetite, with consequent diminished consumption and absorption of food (calcium), rather than from inability to assimilate, into the bones and teeth, the calcium that may be available in the alimentary tract and in the blood. Such animals, both operated and control, should evidently be studied from quantitative nutritional standpoints with foods *known* to be particularly rich in *assimilable* calcium and also with diets very deficient in such calcium. The animals received a diet that is ordinarily very nourishing, and we relied in a general way on a normal outcome in this respect. Our results require the skepticism on this point, however, that we are indicating.

Again, it was stated, in this general connection:

It is assumed by Dr. Pappenheimer and by us that the mixed food of the rats, which was given in abundance and eaten freely, was ample in quantity, in quality, and in metabolic availability for the maintenance of the processes of normal calcification in each animal. One cannot be certain of such an outcome in experiments of this kind, however, unless the animals are individually maintained under suitably controlled metabolic conditions on diets of definite composition, of known quantity, and of proved nutritional adequacy. We require also, for correct interpretations of analytic data on calcification, more exact chemical knowledge of the variations in the composition of the bones and teeth of normal albino rats of different ages under given metabolic conditions. It is our intention to investigate in this laboratory, as a part of a plan of research in progress, the facts in these particular connections, with special reference to the possible establishment of definite physiological standards on which further experimental work with albino rats may be conducted more accurately.

The experiments described in the present paper were intended to inaugurate a series of inquiries into the dental effects of dietary and nutritive variations, *under the different conditions of the general experimental procedure now in vogue in this laboratory in researches on dentition*. The experiments were conducted with the purpose of laying a foundation for extended study of nutritive problems related to ossification and dentition in albino rats, under dietary conditions favorable to direct comparisons of results obtained from many points of view, with special reference to the significance of such results in the correct interpretation of data, past and future, on the dental effects of internal secretions.

II. On the Influence, in Dogs, of Additions of Hydrochloric Acid and β-Hydroxybutyric Acid to the Diet.

INTRODUCTION.

During the preliminary stages of the work, in this laboratory, on the dental effects of thyro-parathyroidectomy, and before the author of this paper had been invited to participate in the work,[4] Drs. Gies and Morgulis began a series of experiments to determine the dental effects of hydrochloric acid and β-hydroxybutyric acid in the food, from the standpoints both of mechanical contact and metabolism. Prior to the inauguration of these experiments, Erdheim and others appeared to have found that dental calcification is impaired by parathyroidectomy. The reason for such impairment, as a result of this glandular deprivation, had not been determined. Dr. Gies assumed that intracellular non-availability of calcium or phosphorus, or both, as well as acidosis, might have been important factors in effecting Erdheim's results, and accordingly he inaugurated the experiments described in this paper. Referring to these experiments it was stated a year ago:[5]

In collateral experiments on 16 puppies we aimed to determine some of the dental ef-

[4] Gies and collaborators: *Loc. cit.*

[5] Gies and collaborators: *Loc. cit.*

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fects of artificial acidosis; also of under-nutrition with respect to calcium and phosphorus. The experiments on the dogs were in progress when the oral report was presented. The results in this particular connection will accordingly be considered in the next report.

Since the foregoing statement was published, experiments on rats were added to the series. This paper includes, therefore, essential data pertaining to the earlier experiments by Gies and Morgulis, also to those in which I co-operated with them, and to those conducted by me under Dr. Gies' guidance.

GENERAL PROCEDURE.

Normal puppies from a given litter, or pair of litters, were kept in one of Gies'[6] metabolism cages and given, daily, closely equivalent amounts per kilo, of a basal ration. Some dogs in each litter received the daily basal ration unmodified; the remaining dogs received it with added, subtracted, or substituted ingredients. The constituents of the ration were newly assembled and thoroughly mixed daily, the total mass presenting the consistence of thick soup. As a rule, the control animals ate the daily mixture eagerly and with apparent relish at the first presentation. At feeding time the puppies were separated for a few minutes, in or out of the cage, until the allotted amounts of food were ingested. The rest of the time, the puppies were kept together in the cage, thus affording them all the advantages of the companionship they playfully enjoyed in each case. Although their movements were comparatively restricted, there was plenty of room in the cage for the activity that healthy puppies commonly exhibit.

[6] Gies: *American Journal of Physiology*, 1905, xiv, p. 403.

Sections of ox-femur bones were kept in the cage, so that the puppies would have "something hard to bite" and which, frequently gnawed, would stimulate growth of the teeth and test their soundness. These pieces of bone were deeply grooved as a result of the gnawing to which they were repeatedly subjected by each puppy.

The animals were kept under close observation. Their individual weights were recorded weekly. Their teeth were examined repeatedly. Every effort was made to maintain uniform environmental and nutritive conditions in all respects, except those unavoidably involved in the incidence of the influences under investigation.

At the conclusion of the experiment the animals were chloroformed and decapitated. The heads were preserved in 20 per cent. alcohol (occasionally renewed) until some of their teeth could be analyzed. Various bones were also removed, promptly cleaned mechanically, dried in the open air at room temperature, and kept in storage, wrapped in paper, in a dry place.

The teeth selected for analysis were incisors from both jaws, as in the case of the experiments with rats (described in the succeeding section). The teeth were carefully removed, with suitable dental forceps, first of all by gripping and fracturing the bone about the root, thus loosening the tooth, preparatory to extracting it, without running the risk of scraping off enamel and changing the basis for analytic comparisons. Adherent bone fragments were carefully and completely removed, and the tooth dried in a hot-air oven for about 24 hours prior to its pulverization for analysis.

After the desiccation of the teeth and

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the thorough removal from each, with a dull scalpel, of all adherent extraneous deposits and fragments, they were crushed in a modified Plattner "diamond" mortar, made of very hard steel and with all adjustable parts fitting together so intimately that no fragments were ejected. The resultant powder was transferred with all due quantitative precautions to a weighed porcelain crucible and desiccated, at 100–110°C., to *constant weight.* The dry weight of the incisor teeth of each puppy, obtained very accurately in this way, is recorded in the corresponding table.

The dental powder in each case was then thoroughly incinerated to constant weight in a "multiple unit" electric muffle, the temperature of which was the same for the teeth of each group of puppies, and approximately the same for all the incinerations in these experiments. This temperature was always in the range of red, but not white, heat, in order to avoid fusion of the ash. As a rule, the powders were burned for about 2 hours and weighed, then reburned for another period of 2 hours. The resultant quantities of ash are recorded in the corresponding table.

The ash in each crucible was finally treated with 1 per cent. hydrochloric acid solution on a "hot plate." The acid liquid thus obtained for incisor teeth from each puppy was diluted, with distilled water, to 100 cc., bottled, and preserved, with a few drops of toluene, against the action of micro-organisms.

Determinations of calcium were made by the McCrudden method in 10 cc. portions of the solutions thus prepared.[7] Phosphorus was determined by the "official agricultural" method.[8] Each recorded value for calcium or phosphorus content, as given in the accompanying tables, represents the average of *closely agreeing duplicate results.*

(This procedure was practically the same as that more fully described elsewhere.)

FIRST EXPERIMENT.

Dogs 1–4. For the first experiment we used four normal puppies (1–4) of unknown mongrel pedigree of the same litter. They were about 3–4 weeks old at the beginning of the experiment.

The basal ration for all the dogs was composed as follows:

Basal ration, Dogs 1–7.

	Daily, per animal.	
Milk	1-20 cc.	Per 100 gm. of body-weight
Water	5–15 "	
Raw, hashed, washed beef (heart)	2–3 gm.	
Cracker-meal	1 "	
Sucrose	0.5 "	
Lard	10 "	
Infusorial earth	5 "	

The milk was decreased, and the amounts of water and meat increased, gradually, as the animals grew older. The amount of water varied inversely with the amount of milk, *i.e.* more water was allowed as the milk was cut down.

[7] McCrudden: *Journal of Biological Chemistry,* 1911, x, p. 187.

[8] Official Methods of Analysis. Assoc. of Off. Agric. Chemists, *U. S. Dep't. Agric. Bull.* 107, 1912, p. 2.

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The infusorial earth was added to give bulk and firmness to the feces.

Variations in dietary conditions were made uniform throughout, on the basis of body-weight, whenever the basal diet was altered, so that each animal daily received the same kind and relatively the same quantity of food as the others.

In addition to the basal ration, puppy 1 received $n/10$ or $n/20$ β-hydroxybutyric acid solution (Kahlbaum), puppy 2 received $n/1$ hydrochloric acid solution, daily in the food. (The water in each of these solutions was included in the basal allowance.) Throughout the experiment, after a preliminary period of *approach* to a maximum, care was taken to *adjust* the proportion of acid in each case to the quantity of bases and proteins in the individual food mixtures, so that approximately the maximum amount of acid that the food-mixture would hold, in a *combined* state, was present in each instance. The absence of *free* acid was always ascertained by means of the Günzberg test. (Dogs 3 and 4 received no acid—they were "control" animals.)

This plan of giving about as much acid as the food could "carry," in the *combined* state, accorded with a purpose to study the possibilities of acidosis in the absence of an excess of basic ions in the food. Although, under such circumstances, the *absolute* amount of acid in the daily dose of the treated puppies had to be decreased, to prevent presence of *free* acid in the diet, the *relative* acidity of the food-mixture was unchanged or increased. The food-mixtures for the treated animals were strongly acid to litmus and very sour in taste. The β-hydroxybutyric acid mixture was often unpleasantly tasteful and odorous.

The actual amounts of acids, given to the respective animals in a period of 180 days, were:

	Total.	Per day. Average.	Maximum.
β-Hydroxybutyric acid (No. 1)	227.27 gm.	1.26 gm.	2.0 gm.
Hydrochloric acid (No. 2)	84.12 "	0.47 "	1.85 "

The range of dietary variation and acid treatment is shown by the data in the accompanying summary.

Data pertaining to the range of dietary variation and acid treatment: Dogs 1–4.

Dog.	Time.	Body-weight.	Milk	Meat.	Water.	Cracker-meal.	Sugar.	Lard.	Infusorial earth.	Acid.
		gm.	cc.	gm.	cc.	gm.	gm.	gm.	gm.	gm.
1	Beginning	1685	150	. .	10	15	. .	. .	1	0.010 β-hydroxybutyric.
	End	4950	56	112	350	56	28	10	5	2.000 " "
2	Beginning	1830	150	. .	10	15	. .	. .	1	0.0036 HCl.
	End	3950	48	96	480	48	24	10	5	0.400 "
3	Beginning	1635	150	. .	20	15	. .	. .	1	(*Control.*)
	End	3560	44	88	440	44	22	10	5	
4	Beginning	1415	150	. .	20	15		. .	1	"
	End	2900	36	72	360	36	18	10	5	

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All of these animals, including those that received acid, were playful and had good appetites throughout the greater part of the experiment. Puppy 2, which received hydrochloric acid, often showed reluctance to eat, toward the end of the experiment, but usually ate her portion after several presentations of the residues.

In the course of his experiments, under the auspices of the First District Dental Society of the State of New York, on the effects of acids on teeth, Dr. Gies observed that enamel appeared to be wholly unaffected by physiological proportions of *combined* hydrochloric acid, even during prolonged periods of contact. This observation afforded the experimental justification for presenting acidified food to animals in studies of the *metabolic* influence, on teeth, of artificial acidosis induced by administration of acid *per os*. It is obvious that, if acid added to the food injures enamel directly, such experiments as these would be pointless. We found, in confirmation of this significant experimental fact, before the feeding of our animals was started, that, when a normal human tooth was submerged in food-mixtures containing more added hydrochloric acid than that in the most acid mixture ever given to any of our puppies (first and second experiments), the tooth retained its original luster and was apparently unaffected by the treatment. The chemical data of these experiments show the same result for the dog-teeth. *Experiments in this particular nutritional relation, by previous investigators, were conducted without regard for the consequences of direct dental action of acid administered* per os.

The experiment was started Feb. 6, 1914. The acid treatment was begun on Feb. 13th. The condition of the teeth at that time was referred to in the record as follows: "Teeth about same degree of growth—those of puppy 4 (control) perhaps a little behind others in size." For March 16th the tooth-record runs: "No. 4 (control) now in the lead; No. 2 (HCl) apparently behind others; controls (3, 4) better than treated pups (1, 2)—teeth wider and longer." The occlusion of the teeth of No. 2 (HCl) gradually became abnormal and by the end of the experiment the dental misfit was a striking illustration of extreme "underhung bite" (*epharmosis*). There was no indication of superficial deterioration of the teeth, however, in dog 1 or in any of the others. On July 18th, the following remarks were recorded about the teeth: "Teeth—sequence—4, 1, 3, 2; 4, 1, and 3 very similar; 2, bad malocclusion. No evidence of any effect of acid directly on teeth. All temporary teeth displaced." Before the teeth were analyzed it was observed that the teeth of dog 2 were smaller than those of the remaining members of the group. The difference was especially noticeable in the poorly fitting incisors.

On June 13th one fore leg of puppy 4 (*control*) was fractured through the radius and ulna, just above their articulation with the carpal bones. We knew of no reason for this result except, presumably, a rhachitic condition of the affected bones that was aggravated by the rough play in which the puppies engaged repeatedly. On June 17th there was a similar mishap in dog 2 (HCl); on June 18th again in the other fore leg. Dog 2 was the most strenuously playful puppy in the quartet, frequently terminating a set-to with a show of ill-temper. Possibly its greater activity made more pronounced a rhachitic

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weakness that was present in all the puppies. Dogs 1 and 3 showed no signs of bone deficiency.

The animals increased in weight steadily until about July 1st. During the remainder of the experiment (6 weeks) they failed to gain. The maximal, terminal, and initial body-weights are given in the accompanying summary.

The results of the analyses, expressed as percentages of calcium (Ca, *not* CaO) and phosphorus (P, *not* P_2O_5) in the dry-weight and in the ash of the teeth, will be found in Table 1. This table also indicates the dry-weight of the teeth, the percentage of this dry-weight in the body-weight of the animal, the yield of ash, and the organic matter of

Data pertaining to the weights of Dogs 1–4.

Dog No.	Condition (treatment).	Maximum body-weight.		Final body-weight, Aug. 13.	Initial body-weight, Feb. 6.
		Date.	Grams.	Grams.	Grams.
1	β-Hydroxybutyric acid	July 2	5050	4950	1590
2	Hydrochloric acid	" 25	4420	3950	1495
3	Control	" 9	3980	3560	1510
4	"	" 9	3050	2900	1315

On August 15, 1914, after 188–190 days of experimentation, the dogs were chloroformed.

The teeth selected for analysis were the upper and lower central incisors. The dry-weights recorded for right and left pairs of incisors (upper and lower) afford an interesting demonstration that chemical *symmetry* was not materially affected in the development of these teeth.

the teeth, the latter two being also expressed in percentages of the dry-weight of the teeth.

The data in Table 1 show that the teeth of puppy 2 (treated with hydrochloric acid) contained the least amount of *dry* tooth-substance, also the smallest ratio of tooth-substance to total body-weight, indicating a slower or less perfect development of the teeth, compared with that in the control animals. The

Data pertaining to the weights of incisor teeth from Dogs 1–4.

Dog No.	Condition (treatment).	Left central incisors.	Right central incisors.	Difference.
		mg.	mg.	mg.
1	β-Hydroxybutyric acid	268	274	6
2	Hydrochloric acid	191	189	2
3	Control	267	280	13
4	"	223	221	2
Total . .	. . . . .	949	964	15

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next smallest ratio of dry tooth-substance to body-weight is that for puppy 1 (treated with β-hydroxybutyric acid), but the total quantity of dry tooth-substance for this dog is as great as that for control puppy 3. The composition of the teeth, on the other hand, was not affected in any noticeable manner by the administration of either hydrochloric or β-hydroxybutyric acid, as shown by the data for ash, for organic matter, and for calcium and phosphorus contents of the whole dry-teeth as well as of the ash. All of these figures exhibit remarkable uniformity.

It appears from these results that the β-hydroxybutyric acid, in the amounts ingested, was totally metabolized without setting up appreciable acidosis; also that the amount of hydrochloric acid administered was probably neutralized, within the limits of the capacity of the organism to do so, without appreciable effect on the teeth, though there might have been some effect on the bones. The last supposition is supported by the results of the analyses of homologous portions of the radius bones of puppies 2 (HCl) and 3 (control) by the methods applied to the teeth, as given below:

Data pertaining to bones from Dogs 2 and 3.

Dog.	Dry bone.	Ash.	Organic matter.	Per cent. of ash in dry bone.	Per cent. of organic matter in dry bone.	Calcium.	
						Per cent. in dry bone.	Per cent. in ash.
	mg.	mg.	mg.				
2	615.0	371.0	244.0	60.34	39.66	21.10	35.00
3	649.3	374.3	275.0	57.65	42.35	22.26	38.60

Although the proportion of ash was greater, the calcium contents of the ash and of the dry matter were considerably lowered, indicating that the mineral composition of the bones was affected.

SECOND EXPERIMENT.

Dogs 5–7. We repeated the first experiment, primarily to ascertain whether the malocclusion in the dog treated with hydrochloric acid (No. 2) had been due to the acid, or to another cause as seemed to be more probable.

The second experiment, on three healthy puppies (5–7) of unknown mongrel pedigree of the same litter, was made as nearly comparable to the first experiment, in all essential respects, as possible. The puppies were about a month old when the experiment was started—March 18, 1914.

The basal ration was the same as that for the puppies of the first experiment.

Puppies 5 and 7 received $n/1$ solution of hydrochloric acid in their daily ration. As in the previous case, special care was taken to adjust the proportion of acid to the amounts of bases and proteins in the food mixture so that all the acid was in *combined* form, the absence of free hydrochloric acid having been established, daily, by the application of the Günzberg test to a sample of the food before it was offered for ingestion. Puppy 6 was the control animal and received

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no acid. The figures for the actual amounts of acid administered, during a period of 63 days, are appended, with the comparative data for puppy 2 (Exp. 1):

	Total.	Daily average.
Puppy 5	19.72 gm. HCl	0.313 gm. HCl
" 7	16.18 " "	0.256 " "
" 2	84.12 " "	0.466 " "

The range of dietary variation and hydrochloric acid treatment is shown by the data in the accompanying summary.

Data pertaining to the range of dietary variation and acid treatment: Dogs 5–7.

Dog.	Time.	Body-weight.	Milk.	Meat.	Water.	Cracker-meal.	Sugar.	Lard.	Infusorial earth.	Acid: HCl.
		gm.	cc.	gm.	cc.	gm.	gm.	gm.	gm.	gm.
5	Beginning	1570	170	17	170	8.5	8.5	. .	2	0.018
	End	2000	20	60	200	20	10	10	4	0.220
6	Beginning	1600	180	18	180	9	9	. .	2	. . .
	End	2830	28	112	280	28	14	10	4	. . .
7	Beginning	1750	200	20	200	10	10		2	0.018
	End	2160	22	66	220	22	11	10	4	0.220

This experiment was much shorter than the first, and much less acid was given, daily and *in toto*, than in the case of puppy 2 of the first experiment. This outcome was due to the development of mange in all the puppies of this group, soon after the beginning of the experiment, with loss of appetite. The proportion of acid in the food had to be kept below the quantities intended. The animals were chloroformed at the end of the 79th day of the experiment.

Although all of the animals appeared to be nutritionally abnormal to approximately the same degree, the data in Table 1 show that the acid-treated puppies, 5 and 7, gained in weight only about one-third as much as did the control animal, 6.

At the beginning of the experiment the following item relating to the teeth was recorded: "Teeth of 7 (HCl)—best, upper and lower; 5 (HCl)—same, upper; smaller, lower; 6 (control)—smallest, upper and lower." The permanent teeth failed to erupt by the end of the experiment. There was no discernible superficial effect of the acid of the food on the temporary teeth. There were no signs of malocclusion in any of the three dogs.

The teeth selected for analysis in each case were the four upper and four lower temporary incisors, and two upper and two lower central permanent incisors, which were well advanced in development.

Analysis of the teeth did not reveal any significant differences in the yield of ash or in the calcium and phosphorus contents, as may be seen from the data in Table 1. Although the three animals differed in initial weight very little, the total amount of dry tooth-substance for puppy 5, which received the greater amount of acid, was almost 20 per cent. less than that for the control puppy

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(6); for puppy 7 it was about 8 per cent. less.

So far as the influence of the administered hydrochloric acid was concerned, the results of the first two experiments agree in indicating, also, that the acid diet retarded the development of the teeth *without injuring the surfaces of the teeth*. The negative outcome of the second experiment, in the matter of occlusion, *suggests* that the malocclusion in dog 2 of the first experiment was not induced by the acid diet.

III. On the Influence, in Dogs and Rats, of Diets Deficient in Calcium or Phosphorus.

EXPERIMENTS ON DOGS.

1. DEFICIENCY OF CALCIUM: *Dogs 8–12.* For this experiment it was necessary to use two puppies from one litter (8 and 9) and three from another (10, 11 and 12), the former being French bulldogs, the latter fox terrier mongrels. Puppies 8, 9 were 40 days old, puppies 10–12, 60 days old, when the experiment was started.

TABLE 1.

(A) DATA PERTAINING TO THE **Body-weights** OF THE DOGS TREATED WITH ACIDS.

FIRST AND SECOND EXPERIMENTS.

Exp.	Dog. No.	Dog. Sex.	Treatment.	Duration of the experiment. Started.	Ended.	Length days.	Body-weight: grams. Beginning.	End.	Gain.
I.	1	♂	β-Hydroxybutyric acid	Feb. 6, '14	Aug. 13	188	1590	4950	3360
	2	♂	HCl	" 6, '14	" 15	190	1495	3950	2455
	3	♀	Control	" 6, '14	" 14	189	1510	3560	2050
	4	♀	Control	" 6, '14	" 14	189	1315	2900	1585
II.	5	♀	HCl	Mch. 18, '14	June 5	79	1570	2000	430
	6	♂	Control	" 18, '14	" 5	79	1600	2830	1230
	7	♂	HCl	" 18, '14	" 5	79	1750	2160	410

(B) DATA PERTAINING TO THE COMPOSITION OF THE **Teeth** OF THE DOGS TREATED WITH ACIDS.

FIRST AND SECOND EXPERIMENTS.

Experiment.	Dog. No.	Dog. Sex.	Dry-weight.	Ash.	Organic matter.	Per cent. of dry tooth in body-weight.	In dry teeth. Per cent. of ash.	Per cent. of organic matter.	Calcium. Per cent. in dry tooth.	Per cent. in ash.	Phosphorus. Per cent. in dry tooth.	Per cent. in ash.
			mg.	mg.	mg.							
I.	1	♂	464.9	351.6	113.3	0.0094	76.59	23.41	28.21	36.83	15.38	20.38
	2	♂	325.7	248.1	77.6	0.0082	76.18	23.82	28.44	37.34	15.57	20.43
	3	♀	465.8	355.4	110.4	0.0131	76.30	23.70	28.08	36.81	15.35	20.12
	4	♀	377.6	291.2	86.4	0.0130	77.12	22.88	28.58	37.07	15.78	20.47
II.	5	♀	316.0	242.0	74.0	0.0158	76.58	23.42	29.22	38.15	16.11	21.03
	6	♂	389.4	296.6	92.8	0.0137	76.16	23.84	29.15	38.24	15.71	20.63
	7	♂	360.3	275.5	84.8	0.0166	76.46	23.54	28.70	37.53	15.76	20.62

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The general procedure, including the basal diet, was similar to that for the experiments in the preceding series, except that the calcium-rich ingredient, milk, was soon wholly excluded. The daily ration was composed as follows:

Basal ration, Dogs 8–12.

		Daily per animal.	
Water		10-15 cc.	Per 100 gm. of body-weight.
Raw, hashed, washed beef (heart)		3 gm.	
Cracker-meal		1 "	
Sucrose		5 "	
Lard		15 "	
Bone ash	(Nos. 8 and 12)	4 "	
Infusorial earth	(Nos. 9, 10 and 11)	4 "	
Calcium lactate	(Nos. 8 and 12)	1 "	
$Na_2HPO_4+NaH_2PO_4$	(Nos. 9, 10 and 11)	1 "	

The phosphate mixture consisted of three parts of the di-sodium and one part of the mono-sodium salt, and was predominantly basic. The infusorial earth had been washed practically free from calcium.

The *control* animals (8 and 12) derived calcium from the calcium lactate, bone ash furnishing phosphorus as well as calcium. The animals deprived of calcium (9, 10, and 11) received phosphorus from the mixture of alkaline and acid phosphates.

The range of dietary variation is shown by the data in the accompanying summary:

Data pertaining to the range of dietary variation: Dogs 8–12.

Dog.	Time.	Body-weight.	Milk.	Meat.	Water.	Cracker-meal.	Sugar.	Lard.	Bone ash.	Infusorial earth.	Calcium lactate.	Sodium phosphates.
No.		gm.	cc.	gm.	cc.	gm.	gm.	gm.	gm.	gm.	gm.	gm.
8	Beginning	1960	100	40	300	20	5	5	4	. . .	1	. . .
	End	3090	. . .	60	340	34	10	15	4	. . .	2	. . .
9	Beginning	2450	125	50	375	25	5	5	. . .	4	. . .	1
	End	3840	. . .	90	410	41	10	15	. . .	4	. . .	1
10	Beginning	4430	220	88	665	44	5	5	. . .	4	. . .	1
	End	6270	. . .	124	630	62	10	15	. . .	4	. . .	1
11	Beginning	2550	130	52	390	26	5	5	. . .	4	. . .	1
	End	3510	. . .	78	400	40	10	15	. . .	4	. . .	1
12	Beginning	3250	165	66	495	33	5	5	4	. . .	1	. . .
	End	5000	. . .	98	500	50	10	15	4	. . .	2	. . .

The experiment was started on April 8, 1914, and ended August 14, 1914—a duration of 129 days. At the beginning the following item relating to the teeth was recorded: "Teeth of 9 better all around than those of 8 (correspond-

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ing control). Teeth of 12 (corresponding control) a little better than those of 10 and 11—in the latter two the teeth were about the same, in general. Before the teeth were extracted and analyzed, the following data were recorded regarding them:

A—8 (control).—Alinement very irregular, above and below. Permanent upper canines erupting beside the temporary. 9.—Alinement normal above, irregular below. Upper permanent canines emerging; lower advanced. B—10.—Alinement fair above, irregular below. Upper canines advanced—only one temporary canine in place; about to come out. Lower permanent canines advanced. 11.—Upper permanent set backward, canines not erupted. Lower alinement irregular, canines advanced. This set far behind the others of this quintet. 12 (control).—Alinement regular above, irregular below. Lower canines advanced; upper canines emerging—temporary upper ones about to fall out.

The significant data for this experiment are summarized in Table 2. It is obvious, from the data there assembled, that the lack of calcium was insufficient either to prevent rapid growth of the animals or to modify the development and composition of their teeth in any significant way.

II. DEFICIENCY OF PHOSPHORUS: *Dogs 13–16.* A group of four mongrels of unknown origin from the same litter were selected for this experiment. The puppies were approximately three weeks old when the experiment was started. The general procedure, including the basal diet, was similar to that for the preceding experiments. The daily ration was composed as follows:

	Daily, per animal.	
Milk	3-5	cc.
Water	7-10	"
Raw, hashed, washed meat (beef heart)	1.5-3	gm.
Cracker-meal	0.5-1	"
Sucrose	0.5	"
Lard	10-15	"
Calcium lactate	1	"
Bone ash (Nos. 13 and 14)	4	"
Infusorial earth (Nos. 15 and 16)	4	"

Per 100 gm. of body-weight.

The range of dietary variation is shown by the data in the accompanying summary.

Data pertaining to the range of dietary variation: Dogs 13–16.

Dog.	Time.	Body-weight.	Milk.	Meat.	Water.	Cracker-meal.	Sugar.	Lard.	Bone ash.	Infusorial earth.	Calcium lactate.
No.		gm.	cc.	gm.	cc.	gm.	gm.	gm.	gm.	gm.	gm.
13	Beginning	1730	173	35	173	17	17	5	4	. . .	1
	End	4510	41	56	260	37	20	10	4	. . .	1
14	Beginning	1750	175	35	175	17	17	5	4	. . .	1
	End	5100	46	64	300	42	20	10	4	. . .	1
15	Beginning	1680	168	33	168	17	17	5	. . .	4	1
	End	3730	34	46	215	30	20	10	. . .	4	1
16	Beginning	1400	140	28	140	14	14	5	. . .	4	1
	End	3780	32	42	200	28	20	10	. . .	4	1

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The diet of these dogs included milk and meat, and was not *totally* lacking in phosphorus, though it was quite deficient for normal nutrition. Milk contains 0.137 per cent., ([54]) and meat 0.175 per cent. ([55]), of phosphorus. A dog weighing 4 kilos would receive on an average, in a ration such as that indicated above, 120 cc. of milk and 80 gm. of meat, or 0.164 + 0.140 = 0.3 gm. of phosphorus daily, or 0.075 gm. of phosphorus per kilo of body-weight.

The experiment was started April 9, 1914, and continued to September 6, 1914—151 days. At the beginning of the experiment the condition of the teeth was recorded in the following item: "Teeth of 15 and 16 (deprived of phosphorus) better above than the uppers of 13 and 14 (controls). Lower teeth of 15 and 16 same or better than those of 13 and 14.

When the teeth were extracted prior to preparation for analysis, the following dental notes were recorded:

13 (control).—No deficiencies. 14 (control).—Upper central incisors slightly worn; no other deficiencies. 15.—Tips of lower in-

TABLE 2.

(A) DATA PERTAINING TO **Body-weights** OF DOGS ON DIETS DEFICIENT IN CALCIUM OR PHOSPHORUS.

Dog. No.	Sex.	Diet.	Duration of experiment. Began.	Ended.	Length days.	Body-weight: grams. Beginning.	End.	Gain.
8	♂	Control	April 8	Aug. 13	127	1950	3090	1140
9	♂	Ca-poor	" 8	" 13	127	2300	3840	1540
10	♂	"	" 8	" 13	127	4260	6270	2010
11	♂	"	" 8	" 13	127	2480	3510	1030
12	♂	Control	" 8	" 13	127	3230	5000	1770
13	♂	"	" 9	Sept. 5	149	1730	4510	2780
14	♂	"	" 9	" 5	149	1750	5100	3350
15	♂	P-poor	" 9	" 5	149	1680	3730	2050
16	♂	"	" 9	" 5	149	1400	3780	2380

(B) DATA PERTAINING TO **Teeth** OF DOGS ON DIETS DEFICIENT IN CALCIUM OR PHOSPHORUS.

Dog. No.	Sex.	Dry-weight of teeth.	Ash.	Organic matter.	Per cent. of dry teeth in body-weight.	In dry teeth. Per cent. of ash.	Per cent. of organic matter.	Calcium. Per cent. in dry teeth.	Per cent. in ash.	Phosphorus. Per cent. in dry teeth.	Per cent. in ash.
		mg.	mg.	mg.							
8	♂	365.6	281.7	83.9	0.0118	77.06	22.94	29.95	38.87	15.75	20.45
9	♂	456.8	356.8	100.0	0.0119	78.10	21.90	29.51	37.78	15.41	19.73
10	♂	510.3	401.9	108.4	0.0081	78.76	21.24	29.77	37.80	15.80	20.08
11	♂	363.4	281.0	82.4	0.0103	77.33	22.67	28.33	36.64	15.63	20.21
12	♂	468.3	366.6	101.7	0.0094	78.28	21.72	29.92	38.22	15.69	20.05
13	♂	398.0	307.2	90.8	0.0088	77.16	22.84	29.55	38.29	15.25	19.76
14	♂	455.2	351.2	104.0	0.0089	77.16	22.84	28.78	37.25	15.42	19.99
15	♂	416.0	317.6	98.4	0.0111	76.33	23.67	27.77	36.38	15.19	19.90
16	♂	482.2	370.0	112.2	0.0125	76.71	23.29	29.28	38.16	15.46	20.16

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cisors worn and tip of one canine broken off. 16.—Teeth badly deficient at tips, especially canines; enamel broken off here and there; exposed dentin brown.

It follows from the experiments of Hawk and Gies(56) that, on a diet similar to the one used in this experiment, consisting of meat, lard, cracker-meal and bone ash, the daily phosphorus requirement of mature dogs is 0.140–0.170 grams per kilo of body-weight. The requirement for young growing puppies is much higher. The fact that the supply of phosphorus in the food of puppies 15 and 16 was about one-half of the calculated requirement for mature dogs, may explain a lack of appetite that characterized them and their slower gain in weight, as compared with the control animals (see Table 2). But the lack of phosphorus in the ration was evidently not sufficient appreciably to affect the development and the chemical composition of the teeth (Table 2).

There was a slightly lower yield of ash by the teeth of the treated animals, also a lower calcium-content of the teeth of one of the treated animals (puppy 15). The phosphorus-content of the teeth was not affected at all. It was observed, however, toward the end of the experiment, that the incisors of the treated puppies (15 and 16) were badly worn at the edges, the tips of the canines being particularly deficient, the enamel having been cracked and broken off to an appreciable degree. The data furnished by the chemical analyses of the teeth do not explain these differences, although the analytic data apply only to the incisors, which were merely worn, not grossly imperfect.

EXPERIMENTS ON RATS.

I. GENERAL PROCEDURE. Albino rats, for the most part born in this laboratory but including a few purchased from a reliable dealer, were used exclusively. Four, always of the same sex and litter, and consequently of the same age and nurtured under identical nutritive conditions, were taken for each experiment. The rats were usually selected at the end of the nursing period, *i.e.* at the age of 20–24 days. Two of them, ordinarily the smaller ones, were designated as control rats, the other two as "experimental" ones. Both groups were kept, as far as possible, under identical conditions, excepting, of course, the dietary ones under investigation. The rats were caged in wooden boxes of suitable size, the bottoms of which were kept covered with a thick layer of coarse sawdust that was frequently renewed to prevent accumulation of excreta. The box was closed with a removable frame covered with wire netting. The cages were kept in a well ventilated room, at ordinary room temperature, entirely free from chemical fumes.

The diet of all animals was a mushy mixture, with the composition indicated below:

Composition of basal ration.

	gm.
1. Washed raw beef (heart)	100
2. Corn starch	30
3. Cane sugar	15
4. Lard	20
5. Butter fat	10
(6. Salt-mixture	4.5)

The experimental variations in the diet were introduced by changes in the nature of the basal salt-mixture.

The meat was obtained from beef-hearts carefully freed from fat and connective tissue, hashed and then washed for 40–60 hours in a fairly rapid stream of water. The meat was then pressed in

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an ordinary hand-press and kept in a cold-storage room in suitable jars. Percentage data, illustrative of the composition of such meat, follow:

Moisture.	Ash.	N.	Ca.	Mg.	P.
74.4	0.60	2.81	0.025	0.012	0.15

the washing process. Röhmann's well-known salt-mixture([58]) was adopted as the mineral basis in each ration. Its composition, and that of the salt-mixtures for the three groups of experiments, are indicated below:

Composition of the "control" salt-mixture.

		gm.
Calcium phosphate	$Ca_3(PO_4)_2$	10
Potassium mono-hydrogen phosphate	K_2HPO_4	37
Sodium chlorid	NaCl	20
Sodium citrate	$Na_3C_6H_5O_7$	15
Magnesium citrate	$Mg_3(C_6H_5O_7)_2$	8
Calcium lactate	$Ca(C_3H_5O_3)_2$	8
Ferric citrate	$FeC_6H_5O_7$	2

Composition of the "experimental" salt-mixtures.

	Ca-free. gm.	Mg-free. gm.	P-free gm.
Calcium phosphate	0	10	0
Potassium mono-hydrogen phosphate	37	37	0
Sodium chlorid	20	20	20
Sodium citrate	15	15	15
Magnesium citrate	8	0	8
Calcium lactate	0	8	8
Ferric citrate	2	2	2

The lard, sugar, and starch were commercial products, and of the purest kind available. Only traces of phosphorus were found in the lard, and 0.007 per cent. in the starch. The butter fat was prepared according to Osborne and Mendel's method([62]) slightly modified. The fresh butter was melted, at about 45°C., the top fat-layer decanted from the greater portion of casein and water. The residual casein and water were removed by contrifugation. The fat thus obtained was shaken with ether and water to free it from admixed salts. The fat was kept in ether, the solution being filtered and heated at about 50°C. to drive off the ether immediately before the fat was used. The butter-fat was used to introduce vitamines and growth-promoting substances, although it is possible that they were entirely removed in

The rations were prepared weekly. The ingredients were thoroughly ground together in a mortar, and kept in tightly closed glass jars in a freezing room. The food was always "fresh." When warmed and presented to the rats, the consistence of the diet was that of a thick paste. Before being fed, the rats were separated in control and "experimental" pairs, and the diet for the day offered to *each pair*. During the rest of the time, the rats of each group were kept together, as in the case of the dogs in the preceding experiments. The ration for each pair of rats was weighed out daily and an amount greater than that consumed on the preceding day was given to each pair. It was found, however, that the maximum amount of our food which two control rats would consume was about 25 grams per day. The

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amount consumed by the "experimental" animals varied from 2–3 grams for two rats per day, as in the advanced stages of the calcium and phosphorus experiments, to 25 grams, as in the case of the magnesium experiments. Although it was intended that each pair should eat as much as the other in a group, it was impossible to effect such equality on a normal basis. The animals on the deficient diets lost their appetites and were, therefore, on the nutritive basis of a "partial" fast—*direct results of the deficiencies themselves.* That the basal diet was well adapted for the nutrition and maintenance of rats will be seen from an examination of the accompanying growth-curves for the control animals, which compare favorably with similar curves for normal white rats, as given by Donaldson([57]). Distilled water was used in all of the experiments reported, was presented in small glass jars, and was changed at least once daily. The animals were weighed once a week.

Teeth (all incisors)and bones (femurs and tibias) were removed, dried, pulverized, analyzed, etc., in accord with the methods described at page 194.

The general procedure accorded with that described at pages 194 and 195.

II. DEFICIENCY OF CALCIUM: *Rat groups 1 and 2.*

Two sets (1 and 2), of four rats each, were used. The first set (1) consisted of four females from a litter of six; the second, four males from a litter of ten. Two of each set (EC and ED) were fed the basal ration (1–5) plus the calcium-free salt-mixture. The remaining two rats of each set (CA and CB—controls) were given the basal ration (1–5), plus the *"complete"* Röhmann salt-mixture. The average amount of calcium actually *consumed* by each control rat a day was 16 mgm. (Ca), while each "experimental" animal consumed an average of 3.2 mgm. of calcium (Ca) per day, or less than one-fourth of the control amount.

The lack of calcium in the diet had very obvious effects on the appearance and behavior of the rats. From the very beginning they showed much less disposition to eat their food than the control rats did. Throughout the experiment the control rats consumed, on an average, one and one-half times as much food as did the rats deprived of calcium. About a month after the beginning of the feeding, the "experimental" rats began to show signs of sluggishness and indifference, spending most of the time motionless in a corner of the cage, whereas the control animals remained active and lively until the very end. The much slower rate of growth of the experimental animals will become apparent from an examination of the growth-curves for this experiment. At the end of the feeding period the "experimental" animals were behind their controls in size and in weight, sometimes weighing less than half the weight of the control rats, *e.g.* group 2. These differences are shown in Table 3 and in Figs. 1 and 2 in the accompanying plate. On March 20th, less than one month after the beginning of the experiment, the teeth of all the experimental animals were dull chalky white in appearance. This heavy opacity persisted to the end, whereas the teeth of the control rats remained a clear translucent yellowish white. It was also noted that the "experimental" animals showed difficulty in breathing, accompanied sometimes by nasal hemorrhages. Toward the end of the experiment, one of these rats (2, ED) died, after two

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days of extreme inactivity and abstinence from food. At autopsy it was found that this rat had edematous lungs with numerous grayish nodules.

The bones of all four "experimental" rats were extremely soft and fragile. The teeth were also unusually soft, and both rats of group 2 had broken incisors at the end of the experiment.

The dry-weight, the ash and the organic matter were determined, for each set of teeth or bones of individual animals, as in the case of the dogs. But, for the determination of calcium, phosphorus, and magnesium contents, the amount of ash yielded by the four incisors of any one rat was insufficient. Therefore, the ash-yields of the teeth of the control animals in each experimental group were combined in one solution and the ash of the teeth of the "experimental" rats in another solution. Accordingly, the figures for calcium, phosphorus, and magnesium, in Tables 4 and 5, represent averages for two or more animals. General data are summarized in Table 3.

The amount of dry tooth substance for the "experimental" rats was only about one-half of that for the control rats, while the amount of ash was less than one-half. The percentage of ash from the dry tooth-substance was 7–12 per cent. less for the calcium-deprived rats than for the controls; the organic matter, on the other hand, was proportionally increased, *i.e.*, 7–12 per cent. While the percentage of calcium was decreased 3–4 per cent. in the dry tooth-substance, the calcium content of the ash did not seem to vary at all. Similarly the phosphorus content in the dry tooth-substance was decreased 2 per cent., while the ash yield was undiminished. There was a relatively large decrease (0.6–1.1 per cent.) in the magnesium content in the dry teeth, and of 0.7–1.2 per cent. in the ash. Unfortunately, the magnesium figures cannot be accepted as conclusive, since the actual amount of magnesium in the aliquot portions of the solutions was too small (0.0002–0.0008 gm.) to be determined accurately. McCrudden's method([52]) for magnesium was used.

As might be assumed, the changes in the *bones* of these rats were more marked. Indeed, the average difference in the percentage of ash between the normal bones and experimentally deficient ones was as great as 20 per cent., the loss of calcium in the dry bone ranging between 6 and 10.6 per cent. There was also a decrease of about 1 per cent. of calcium in the ash. Phosphorus was decreased, in the dry bone, 3–4 per cent.; only slightly, in the ash. Magnesium was decreased considerably, in the dry bone but not in the ash.

Thus, in contradiction of the results obtained by Weiske and by Beraz, a diet deficient in calcium may induce significant "demineralization" not only of the bones, but also of the teeth.

III. DEFICIENCY OF PHOSPHORUS: *Rat groups 3a, 3b,* and *4.*

The phosphorus-poor diet employed in these experiments consisted of the basal ration (1–5) plus the phosphorus-free salt-mixture. This diet contained 0.1 per cent. of phosphorus (P), amounting, on an average, to 7 mgm. of phosphorus (P) per rat per day. The diet of the control rats was identical with that of the "experimental" rats, with the exception of the salt-mixture, the "complete" mixture having been employed instead of the phosphorus-free mixture. The control diet contained 0.28 per cent. of phosphorus (P), the average amount consumed per rat per day having been

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28 mgm. (P), or fully four times as much as in the case of the "experimental" rats.

It was difficult for the young rats to become accustomed to this "experimental" diet, and five animals died after 8, 12, and 35 days of feeding, respectively. Two rats, however, survived, and one was fed for 69 days, while another was fed for 91 days. It was noticed that although the appetite and general condition of these two rats were quite low during the first 50–60 days, they began to improve steadily after this period. This fact is obvious from the accompanying growth-curves of the two rats. But even "experimental" animals 3aED and 4ED gained less in weight and size than the corresponding controls 3aCA and 4CB, as may be seen from the data in Table 3, and as shown by Figs. 3 and 4 in the accompanying plate.

The essential data of this experiment are summarized in Tables 3, 4, and 5.

In the case of the three rats which died young, 3aED, 3bEE, 3bEF, there was a small, but uniform, decrease in the amount of dry tooth-substance and of ash; also a decrease of 1 per cent. of calcium in the dry tooth and of 1 per cent. of phosphorus in the ash. The changes in the two older rats (4EC and 4ED), after prolonged feeding, were more pronounced. The amount of dry tooth-substance was decreased materially; the ash content was lowered 2–4 per cent., the organic matter increasing accordingly. The calcium content of

TABLE 3.

DATA PERTAINING TO THE GROWTH OF THE RATS.

Group.	Rat sub-group.	Sex.	Diet.	Born.	Expt. began.	Expt. ended.	Length days.	Weight: gm. Begin.	End.	Gain.	Remarks.
1	CA	♀	Control	Feb. 2	Feb. 26	May 7	70	29	122	93	Etherized
	CB	♀	"	" 2	" 26	" 7	70	28	124	96	"
	EC	♀	Ca-poor	" 2	" 26	" 7	70	30	88	58	"
	ED	♀	"	" 2	" 26	" 7	70	30	109	79	"
2	CA	♀	Control	" 2	" 26	" 22	85	25	145	120	"
	CB	♀	"	" 2	" 26	" 17	80	25	138	113	"
	EC	♀	Ca-poor	" 2	" 26	" 22	85	24	76	52	"
	ED	♀	"	" 2	" 26	" 17	80	24	77	53	Died
3a	CA	♀	Control	" 2	" 26	Apr. 5	38	22	80	58	Etherized
b	CB	♂	"	Mch. 6	Mch. 27	" 8	12	26	46	20	"
b	CC	♂	"	" 6	" 27	" 4	8	23	36	13	"
a	ED	♀	P-poor	Feb. 2	Feb. 26	" 5	38	22	41	19	Died
b	EE	♂	"	Mch. 6	Mch. 27	" 8	12	24	22	−2	"
b	EF	♂	"	" 6	" 27	" 4	8	19	20	1	"
4	CA	♀	Control	Feb. 2	Feb. 26	May 28	91	23	126	103	Etherized
	CB	♂	"	Mch. 6	Apr. 4	June 12	69	38	123	85	"
	EC	♀	P-poor	Feb. 2	Feb. 26	May 28	91	22	98	76	"
	ED	♂	"	Mch. 6	Apr. 4	June 12	69	40	89	49	"
5a	CA	♀	Control	" 6	Mch. 28	" 7	71	22	117	95	"
a	CB	♀	"	" 6	" 28	" 7	71	23	116	93	"
b	CC	♀	"	" 6	" 28	" 5	69	26	131	105	"
a	ED	♀	Mg-poor	" 6	" 28	" 7	71	23	115	92	"
a	EE	♀	"	" 6	" 28	" 7	71	26	113	87	"
b	EF	♀	"	" 6	" 28	" 5	69	28	119	91	"

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TABLE 4.

DATA PERTAINING TO THE COMPOSITION OF THE TEETH (INCISORS) OF THE RATS.

Group.	Rat sub-group.	Diet.	Dry-weight.	Ash.	Organic matter.	Per cent. of dry tooth in body-weight.	In dry teeth.		Calcium.		Phosphorus.		Magnesium.	
							Per cent. of ash.	Per cent. of organic matter.	Per cent. in dry tooth.	Per cent. in ash.	Per cent. in dry tooth.	Per cent. in ash.	Per cent. in dry tooth.	Per cent. in ash.
			mg.	mg.	mg.									
1	CA	Control	186.6	147.4	39.2	0.163	79.50	20.50	27.45	34.72	16.42	20.80	1.73	2.20
	CB	"	184.8	146.0	38.8	0.149	78.85	21.15						
	EC	Ca-poor	93.0	65.0	28.0	0.105	69.80	30.20	24.60	34.25	14.48	20.40	0.70	0.98
	ED	"	117.0	84.0	33.0	0.107	71.80	28.20						
2	CA	Control	203.5	160.0	43.5	0.140	78.62	21.38	27.61	35.58	16.32	20.93	1.29	1.65
	CB	"	209.2	162.0	47.2	0.152	77.44	22.56						
	EC	Ca-poor	89.0	60.2	28.8	0.117	67.64	32.36	23.76	35.32	14.46	21.51	0.61	0.91
	ED	"	107.4	71.8	35.6	0.139	66.84	33.16						
3a	CA	Control	110.6	83.7	26.9	0.138	75.60	24.40	27.30	35.62	16.75	23.40	. .	. .
b	CB	"	70.6	51.6	19.0	0.153	73.00	27.00						
b	CC	"	49.7	36.9	12.8	0.138	74.00	26.00						
a	ED	P-poor	104.5	79.4	25.1	0.255	75.90	24.10	26.40	35.65	16.60	22.32	. .	. .
b	EE	"	57.8	42.2	15.6	0.260	73.00	27.00						
b	EF	"	45.7	32.6	12.9	0.230	71.30	28.70						
4	CA	Control	220.6	171.9	48.7	0.179	77.92	22.08	27.66	35.00	17.89	22.97	.	. .
	CB	"	228.7	178.2	50.5	0.181	77.93	22.07						
	EC	P-poor	181.0	137.6	43.4	0.184	76.02	23.98	26.22	35.01	15.79	21.07	. .	. .
	ED	"	145.2	106.8	38.4	0.163	73.56	26.44						
5a	CA	Control	201.5	157.5	44.0	0.172	78.16	21.84	26.02	33.36	16.21	20.77	1.02	2.08
a	CB	"	194.9	152.0	42.9	0.168	78.00	22.00						
b	CC	"	210.8	164.2	46.6	0.161	77.90	21.10						
a	ED	Mg-poor	190.4	151.6	38.8	0.166	79.82	21.38	26.64	33.23	17.10	21.33	1.05	2.06
a	EE	"	190.0	152.3	37.7	0.168	80.16	19.84						
b	EF	"	201.0	162.0	39.0	0.169	80.60	19.40						

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TABLE 5.

DATA PERTAINING TO THE COMPOSITION OF THE BONES (FEMURS AND TIBIAS) OF THE RATS.

Group.	Rat sub-group.	Diet.	Dry weight.	Ash.	Organic matter.	Per cent. of dry bone in body-weight.	In dry bones.		Calcium.		Phosphorus.		Magnesium.	
							Per cent. of ash.	Per cent. of organic matter.	Per cent. in dry bone.	Per cent. in ash.	Per cent. in dry bone.	Per cent. in ash.	Per cent. in dry bone.	Per cent. in ash.
			mg.	mg.	mg.									
1	CA	Control	687.4	356.0	331.4	0.563	51.80	48.20	19.16	37.03	10.01	19.35	0.355	0.686
	CB	"	687.0	355.0	332.0	0.554	51.02	48.98						
	EC	Ca-poor	401.9	131.5	270.4	0.457	32.72	67.28	13.13	36.15	7.15	19.69	0.288	0.792
	ED	"	359.1	144.9	214.2	0.329	40.36	59.64						
2	CA	Control	720.8	401.1	319.7	0.497	57.01	42.99	22.44	37.40	11.32	18.87	0.398	0.664
	CB	"	697.3	390.0	307.3	0.505	55.93	44.07						
	EC	Ca-poor	297.7	100.4	197.3	0.392	33.72	66.28	11.80	36.04	6.41	19.57	0.173	0.528
	ED	"	332.5	106.0	226.5	0.432	31.88	68.12						
4b	CA	Control	723.1	407.4	315.7	0.574	56.34	43.66	19.43	37.18	9.91	18.92	. .	. .
	CB	"	708.4	339.4	364.0	0.572	48.25	51.75						
	EC	P-poor	444.0	207.4	236.6	0.453	46.72	53.28	17.31	35.93	9.44	19.58	. .	. .
	ED	"	398.7	199.2	199.5	0.448	49.95	50.05						
5a	CA	Control	678.0	353.5	324.5	0.579	52.18	47.87	19.41	37.05	9.76	18.71	0.365	0.700
a	CB	"	694.8	339.8	355.0	0.599	48.90	51.10						
b	CC	"	726.2	401.4	324.8	0.554	55.24	44.76						
a	ED	Mg-poor	690.2	371.8	318.4	0.600	53.88	46.12	19.65	36.49	10.01	18.77	0.302	0.563
a	EE	"	708.2	366.6	341.6	0.626	51.77	48.23						
b	EF	"	700.2	386.4	313.8	0.588	55.18	44.82						

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the dry teeth was lowered 1.4 per cent.: the phosphorus of the dry teeth and of the ash was lowered almost 2 per cent. While, therefore, a distinct "demineralization" is noticeable for the teeth of this set, it was not as marked as in the case of the rats deprived of calcium.

This smaller degree of "demineralization" also occurred in the *bones* of these rats. The average decrease in mineral matter (ash) averaged only 4 per cent. It is remarkable to observe that, while there was a loss of 2 per cent. of calcium from the bone substance and of 1.2 per cent. from the ash, neither the dry bones nor their ash show any appreciable decrease in content of phosphorus.

IV. DEFICIENCY OF MAGNESIUM: *Rat groups 5, a and b.*

Three rats were fed for 70 days the basal ration containing the magnesium-free salt-mixture. This ration provided for each rat, daily, an average of 1.2 mgm. of magnesium. The control animals were fed the "complete" basal ration plus the complete salt-mixture, and consumed, daily, an average of 4.5 mgm. of magnesium. But even these very low intakes of magnesium seemed to suffice entirely for the metabolic requirements of the rats. For there were no differences whatever, that could be observed throughout the experiment, between the "experimental" and control animals. This fact is borne out by the data pertaining to the increase of body-weight in Table 3 and by the analytic data for teeth and bones in Tables 4 and 5. The slightly lower magnesium content of the bones, and of the ash of the bones, of the "experimental" animals, does not deserve special consideration.

It is evident that, in order to obtain conclusive data on the rôle of magnesium in the development of the teeth and bones, it would be necessary to use a diet containing much less magnesium or none at all.

IV. General Discussion of Data in Sections II and III.

The thesis which may best be made, on the basis of the results of these experiments, is that the teeth are endowed with a greater metabolic resistance than other organs, but withal, like other organs, are quite amenable to change in response to special nutritive conditions. The first part of this thesis has been so heavily emphasized in the past, and the latter part so greatly underrated, as to make it appear that teeth are immutable organs. To restore the tooth to life, so to speak, was one of the purposes of this series of investigations. (See Gies [2].)

It is obvious that tooth metabolism forms an integral part of the organism's metabolism in general, and of its mineral metabolism in particular. The importance of mineral substances in the animal economy has been amply and conclusively demonstrated by the large number of classical physiological investigations by Forster(12), C. Voit(13), Lunin(14), Aron(15), Socin(16), and many other workers. [An excellent review of the facts of mineral metabolism was published in a recent bulletin of the Ohio Exp. Station by Forbes and Keith(18).]

It is now a recognized fact that the two chief conditions responsible for disturbances in the normal *mineral* equilibrium of the organism are (1) the presence in the body of such substances as acids, which exercise a special solvent action on basic minerals, and (2) general deficiency in the food supply of elements or radicals to replace the normally

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wasted or catabolized mineral portions of the cells and tissues.[9]

What is the relation of our findings to those already available on these two phases, is a question which naturally suggests itself? While it was shown by Salkowski([19]) and Walter([20]) that administration of large excesses of mineral acids led to "demineralization" of the tissues and to death, it was also shown by the same investigators that the animal organism is capable of protecting itself against such injury, within rather wide limits, by eliminating the excesses of acid in the form of neutral salts with basic elements—with calcium, magnesium, sodium, and potassium of the food and of the tissues; also, with the ammonia produced in protein catabolism. showed that prolonged feeding of rations yielding a distinctly acid ash, like oats, or the administration of excesses of dilute sulfuric acid, or of acid salts, *e.g.* dihydrogen sodium phosphate, with foodstuffs yielding an alkaline ash, interfered with the normal growth of the animals, increased the water content of the bones and decreased the ash-yield from the bones, the ash being lower in its calcium content than the ash from the bones of the control animals. It is of very great interest to note that, even in the animals which suffered the severest loss of mineral matter from the bones and tissues, Weiske found no corresponding loss in the teeth. A glance at the accompanying summary reveals this point strikingly:

Data pertaining to the composition of bones and teeth of rabbits as affected by the food (Weiske[22]). Per cent. in dry, fat-free substance.

Ration.	Long Bones.				Teeth.			
	Ash.	CaO.	P_2O_5.	MgO.	Ash.	CaO.	P_2O_5.	MgO.
Hay	66.51	33.86	26.02	0.73	78.72	37.28	33.88	2.63
Hay+oats	66.65	33.62	26.15	0.78	77.93	36.73	33.30	2.52
Oats	62.16	30.85	24.85	0.94	77.61	36.18	33.36	2.75
Oats+NaH_2PO_4	63.38	31.76	24.94	0.68	80.01	38.08	34.48	2.67

Recent researches, especially those of Henderson([63]), have established with certainty the efficient operation of the neutralizing mechanism of the animal body presented by the salts of the protoplasm, lymph and blood.

Weiske([21]), in an extensive series of experiments on young sheep and rabbits,

While the bones of the animal which received the most acid food, namely, oats and acid phosphate, suffered considerable "demineralization," the teeth showed an actual increase in mineral matter, *i.e.* in calcium phosphate. It must be noted, however, that most investigators seem to concur in the conclusions that, in order to induce "demineralization" of bones, either a very large excess of acid or the very prolonged action of smaller quantities of acid, are necessary.

The most recent corroboration of this

[9] This consideration ignores the influence of internal secretions and the chemical co-ordination of mineral metabolism—phases of nutrition now under detailed study in this laboratory.

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conclusion will be found in the results obtained by Steenbock, Nelson, and Hart([23]). These investigators report that swine and calves did not lose calcium after ingestion of comparatively large quantities of hydrochloric acid—that loss of calcium in the urine and feces did not become evident until the amount of acid was increased to 400 cc. of *n*/1 hydrochloric acid solution per day.

Secchi([24]) found, in his study of a large number of human cases of hyperchlorhydria, that elimination of the alkaline earths was not influenced by excessive production of gastric hydrochloric acid.

Weiske's work, referred to above, is the only study that could be found relating to the *effects of acid ingestion on teeth*. Weiske's interest in the teeth appears to have been merely casual, however, for he paid no attention to the possible effects of direct contact between the uncombined acid in his diets and the teeth of his animals. Neither does he comment on the growth and development of the teeth under the influence of the acid rations. Our findings, on the influence of hydrochloric acid on the teeth, supply these important omissions, and show that, while the composition of the teeth may not change, their development may be noticeably arrested by the ingestion of sufficient excesses of *combined* mineral acid that are without direct action on the enamel.

Many investigators have looked for the cause of osteomalacia and rhachitis in the possible solvent action of excesses of organic acids produced in the system by deranged metabolism. Since lactic acid was found([25]) associated with a number of human cases of osteomalacia, the action of that acid on bone metabolism was studied. Heitzmann([26]) induced typical rhachitic changes in the bones of dogs and cats after several months of subcutaneous administration of lactic acid, but his results were not conclusive, since the food of the animals was also very poor in lime. On the other hand, Heiss([27]) fed a dog for ten months with food containing as much as 7–9 gm. of lactic acid daily, and failed to discover solution of bone material by the acid. The results obtained by Seidamgrotsky and Hofmeister([28]), after administration of lactic and hydrochloric acids to goats with their natural diets, were equally inconclusive. Different results were obtained by Bonnamour and Escallon([29]), who injected intravenously into a rabbit 378 gm. of lactose during three months in 10 gm. doses. They found severe decalcification of, and increase of magnesium in, the bones of the animal, which are conditions typical of osteomalacia. Their analytical figures are summarized below, for per cent. of dry bones:

	Control.	Treated.
CaO	31.66	24.80
MgO	0.60	3.04
P_2O_5	16.63	25.50

Levy([30]) claimed that loss of mineral matter from the bones cannot be due, at any time, to the solvent action of acids, because he found that acids dissolve, from finely divided bone *in vitro*, calcium carbonate much more rapidly than calcium phosphate. It is well known that the normal ratio of calcium carbonate to phosphate is not disturbed in rhachitic bones. Liesegang and Kranz, in a very recent investigation have shown, on the other hand, that acids dissolve the above-mentioned calcium salts at the same rate, when a mixture of the two is suspended in a colloidal medium such as gelatin. These

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results suggest that Levy's inference was unfounded.

No record was found of the effect, on the mineral metabolism, of the ingestion of another comparatively strong organic acid of pathological significance, namely, β-hydroxybutyric acid. That both lactic and β-hydroxybutyric acids are normally oxidized by the organism is well known. It is quite possible that the lack of metabolic influence of these acids on the teeth may be explained by the fact that exceptional quantities of them would be required to exceed the capacity of the protective oxidizing mechanism of a normal animal.

It is evident that the presence of moderate quantities of acid could not be the only factor in bringing about the disease conditions involving loss of mineral matter from bones and other tissues.

Another very important possible cause was sought in foods poor in minerals. The organism demands a constant supply of mineral material for the discharge of all its normal physiological processes. When this supply is not adequately furnished by the food, the organism may and does draw upon tissues rich in these materials. That the bones contain a mineral reserve, and are drawn upon in such cases, has been established beyond doubt. The biochemical and medical literatures contain a very large number of data to that effect. Citation of a few researches in this relation, which are both most authoritative and conclusive, will suffice for our present purpose.

It was early demonstrated by Forster[12] that the total removal of minerals from the diet led to prompt death of the animals involved. Death occurred, very often in such instances, sooner than would have been the case in total starvation. In both cases, of total calcium deprivation and in total starvation, there is gradual loss of mineral matter from the bones, but the composition of the ash from the bones does not change, as was shown by Weiske[31]. Weiske also found, in the same study, that, in total starvation of rabbits, the teeth of the animals were not affected but the bones were modified in the manner indicated above. Bunge[17] and Lunin[14] showed that the extreme results of mineral starvation were due to the production of acids in the body, by the oxidation of proteins, and the lack of bases for neutralizing purposes. Therefore, in order to explain these severe effects, the influence of deprivation of one or two dietary mineral substances at a time was studied.

E. Voit[32] fed several puppies of different races on calcium-poor food (12–14 mgm. Ca per day) for as long as five months. The skeletons of these dogs failed to develop normally, and they soon began to exhibit rhachitic symptoms. The chemical analyses of the skeletons showed that there had been great loss of mineral matter. One young dog, fed a calcium-poor diet for five months, developed, during the first month after birth, a severe case of rhachitis. Its skeleton showed a loss of 11 per cent. of ash and a loss in the ash of 5 per cent. of calcium, as compared with a normal skeleton.

H. Beraz[33], who analyzed the teeth of these animals a few years later, found very small differences, or none at all, in the composition of the teeth. The summary on the next page shows the greatest differences in tooth composition obtained by Beraz.

The differences in the composition of the teeth of the first two dogs cannot, however, be accepted as conclusive. It

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Data pertaining to the composition of dog teeth. (Beraz[33].)

		Per cent. in dry teeth.			Per cent. in ash.	
		Ash.	CaO.	P_2O_5.	CaO.	P_2O_5.
1	Canine teeth, normal dog, age given as "old"	74.25	37.08	30.76	49.94	42.36
2	Permanent (all) teeth, rhachitic dog, 180 days old; fed for 162 days, Ca-*poor* diet	71.84	36.77	31.14	51.99	43.31
3	Milk teeth, puppy, 63 days old; fed 28 days, Ca-*rich* diet	75.95	40.05	32.96	52.73	43.40
4	Milk teeth, puppy, 63 days old; fed 28 days, Ca-*poor* diet	74.33	38.40	32.19	51.68	43.31

will be noted that the comparison is made of only the canine teeth of an *"old"* dog and of all the teeth of a *young* dog (180 days of age). That different teeth differ in composition, and that the ash-yields from similar bones and teeth increase with age, was shown conclusively by Weiske([31]) and by Wildt([35]). The comparative basis, in the cases of the last two dogs, is more strictly legitimate, and here the observed differences must be regarded as more significant. The teeth of the dog fed for 28 days on a Ca-poor diet (12–14 mgm. of Ca per day) show 1.6 per cent. less ash and 1.6 per cent. less CaO, and the ash is 1.1 per cent. poorer in CaO than the teeth and the ash, respectively, of a normally fed dog of the same age and race. Beraz himself, however, speaks of these differences as *highly insignificant,* having in mind, evidently, the much greater differences obtained, *for the bones,* by E. Voit. In interpreting his results, Beraz concludes:

> While a prolonged calcium-poor diet given to young animals at the time of the strongest tooth development may influence the rate of growth of the teeth, in older animals (dogs) the teeth are capable of growing independently of the amount of calcium in the food . . . so that in a short period of administration of a calcium-poor diet, the latter may remain without effect on the development and composition of the teeth, at the same time that the bones undergo strong chemical changes.

Beraz advanced the following explanation of the above statement:

> Teeth are small organs, whose volume and weight form a small percentage of the body in comparison with the skeleton, but the mechanism for their building and nutrition represents a very elaborately ramified network of vessels. The latter are capable of bringing food to growing teeth, even when the lack of calcium in the food begins to cause a lag in the ossification of growing bone tissue.

It may be pointed out, in this connection, that the efficiency of the nutritional apparatus of the teeth might be perverted into *withdrawing* or *withholding* various mineral constituents from the teeth. That there may be such withdrawals or withholdings of tooth-constituents is suggested, though not shown, by our findings on the teeth of at least nine rats, four of which received a calcium-poor, and five a phosphorus-poor, diet. While Beraz obtained a decrease in the mineral content of the teeth of but *one* dog, the decrease was not great enough to cause a visible change in the appearance and ser-

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viceability of the teeth. The fragility and softness of the teeth of the nine rats in our own experiments demonstrate, in contradiction to Beraz and to Miller([36]), that teeth may be seriously affected by the same conditions which impair the growth and maintenance of the bones.

Weiske showed that an excess of phosphorus in the diet may cause a deposition of phosphorus in the teeth, as may be seen from the summary of his results on p. 213. While there have been many investigations ([15-49]) on the effects of diets lacking phosphorus in its various forms, the effect of such diets on the teeth was not studied. It has been shown, however, that, in the organism, phosphorus is closely connected with calcium. We found, in the case of our rats, for example, that rations poor in phosphorus deprived the teeth not only of that element but also of calcium.

Magnesium is always present in the bones and teeth of vertebrates, in quantities that are small but fairly constant for any given species. The exact significance of this element, however, is not yet understood. A number of investigators ([50]) report an increase in the magnesium content of bones in cases of osteomalacia and rhachitis, in man and in animals. Gies, Morgulis, and the present author ([2b]) found an increased magnesium content, also, in the teeth of thymectomized rhachitic rats. Weiske([51]) showed that extra magnesium may be deposited in the teeth, as well as in the bones, of rabbits when magnesium carbonate is added to a ration of oats. Weiske concluded, from data in the same investigation, that, while the alkaline salts of magnesium and strontium may correct the acidity of a diet, neither of these elements can physiologically replace calcium in the skeleton.

It follows, from our own experiments, that the amount of magnesium needed to maintain the "magnesium balance" in the rat is very small.

Thus we may conclude that, although teeth may resist unfavorable nutritional conditions, they may do so only within certain physiological limits, beyond which this resistance gives way to disturbances hitherto found to occur readily in the bones.

V. Summary of General Conclusions.

1. β-Hydroxybutyric acid (combined), administered with food to a young dog, to the extent of 227 gm., during a period of 180 days, produced no effect upon the appearance, rate of growth, or chemical composition of the teeth.

2. A total of 84.12 gm. of hydrochloric acid (combined), administered in food to a young dog during a period of 180 days, retarded the development of the teeth, but did not affect the chemical composition of the teeth. Two puppies, that received 20 and 16 gm., respectively, of hydrochloric acid (combined), during a period of 63 days, showed impaired development, but no differences in the chemical composition, of the teeth. No superficial deterioration of the teeth was observed, in these tests, as a result of the ingestion of either the β-hydroxybutyric acid or the hydrochloric acid.

3. A diet of meat, sugar, cracker-meal, and lard, ordinarily considered to be poor in calcium, failed to affect the development and the chemical composition of the teeth of three puppies, during a feeding period of 127 days.

4. A diet consisting of a small amount of milk, meat, sugar, cracker-meal and

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lard, calculated to provide less than half the amount of phosphorus physiologically required by dogs, produced a slight degree of "demineralization" of the incisors of two puppies, during a feeding period of 149 days. At the end of this period the incisors and canines of these puppies appeared more worn at the tips than the corresponding teeth of the control animals.

5. Young rats when fed a ration providing 3 mgm. of calcium (as Ca) per animal per day, for a period of 70–85 days, exhibited loss of appetite, stunted growth, and poor development of the whole organism. The bones and the teeth were unusually soft and fragile. "Demineralization" of both teeth and bones was very pronounced. The average difference between the ash-yield from dry teeth of the control rats and of the rats deprived of calcium was 8.5 per cent.; it was 20 per cent. in the case of the bones. There was an increase in organic matter corresponding to this decrease in mineral matter. There were losses of 2–4 per cent. of calcium, and of 2 per cent. of phosphorus, in the dry teeth. There was also a loss in the magnesium content. The composition of the ash from the teeth varied but little. The loss of calcium, phosphorus, and magnesium was more pronounced in the bones.

6. A ration providing 7 mgm. of phosphorus (as P) per animal per day, when administered to young rats for 70–90 days, led to stunted growth and to poor development of bones and teeth. The effects were not as severe, however, as they were in the cases of calcium deprivation. There was a distinct loss of mineral matter from the teeth and from the bones, the loss of calcium having been more pronounced than that of phosphorus.

7. A ration poor in magnesium, that provided only 1.2 mgm. of that element per rat per day, was without any noticeable effects, during a period of 70 days, upon the development and the composition of the teeth and bones of three young rats.

There were no definite effects on the dimensions, curvature, or weights of the incisor teeth of the rats that could be ascribed directly to the dietary treatment; although, in accord with the prevailing preponderance in body-weight of the control rats, the teeth of the control rats were somewhat heavier than those of the "treated" animals.

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NOTE.—The *Discussion* on the following pages relates to the gist of the papers preceding this one, by Miller and Gies (p. 161) and by Gies (p. 189) and of this paper. Each of these three papers contains data that were not available last May, when the oral report was presented. As was stated at the end of the paper imemdiately preceding this one (Gies, p. 191), results "on the passage of trypan blue from the pulp to the enamel" and "on the passage of water back and forth through enamel," which were presented in the oral report last May, and mentioned approvingly in the ensuing oral discussion, "will be published in detail after the completion of the experiments in these connections that are now in progress."—W. J. G.

EXPLANATION OF PLATE.*

FIG. 1. Female rat, 2-CA, 109 days old. Fed "control" diet for 85 days. Weight 145 grams.

FIG. 2. Female rat, 2-EC, 109 days old. Fed calcium-poor diet for 85 days. Weight 76 grams.

FIG. 3. Male rat, 3a-CA, 98 days old. Fed "control" diet for 69 days. Weight 123 grams.

FIG. 4. Male rat, 4-ED, 98 days old. Fed phosphorus-poor diet for 69 days. Weight 89 grams.

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* See "growth-curves" on pp. 222 and 223.

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FIG. 1.

FIG. 2.

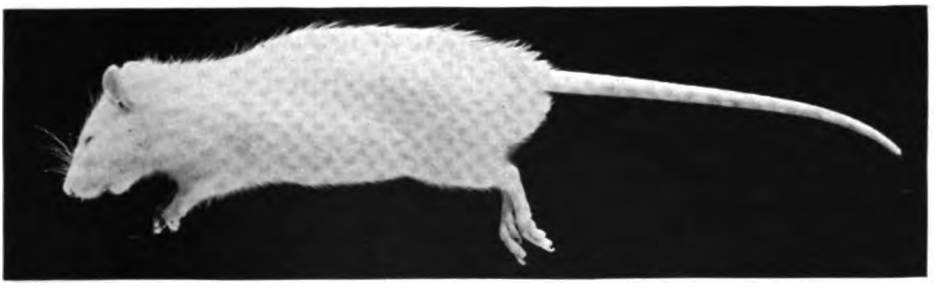

FIG. 3.

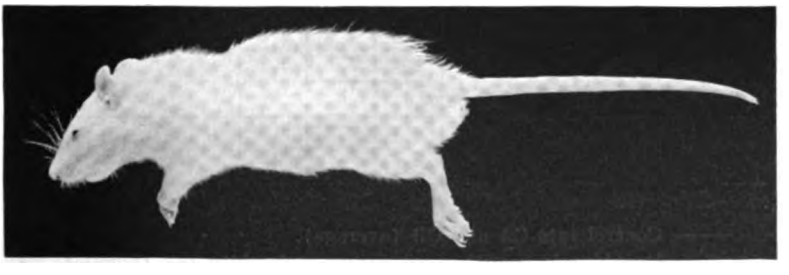

FIG. 4.

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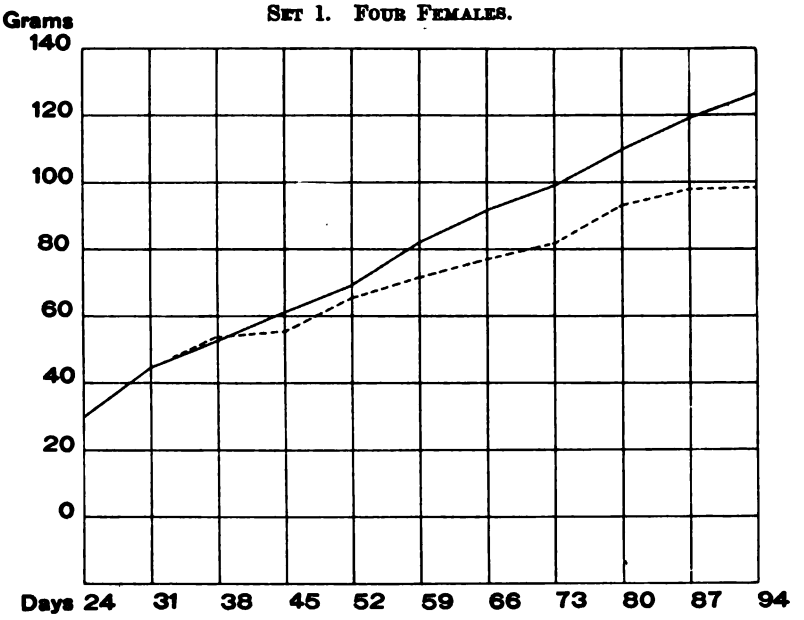
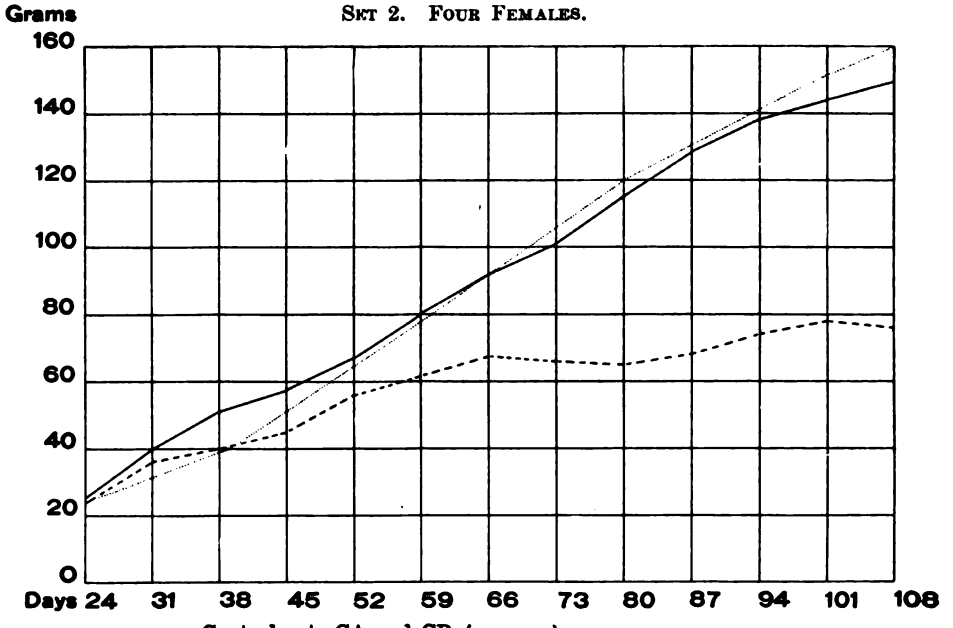
SET 1. FOUR FEMALES.



—— Control rats CA and CB (average).
----- Ca-poor diet. Rats EC and ED (average).

SET 2. FOUR FEMALES.



—— Control rats CA and CB (average).
····· Donaldson's growth-curve for normal white rat (female).
----- Ca-poor diet. Rats EC and ED (average).

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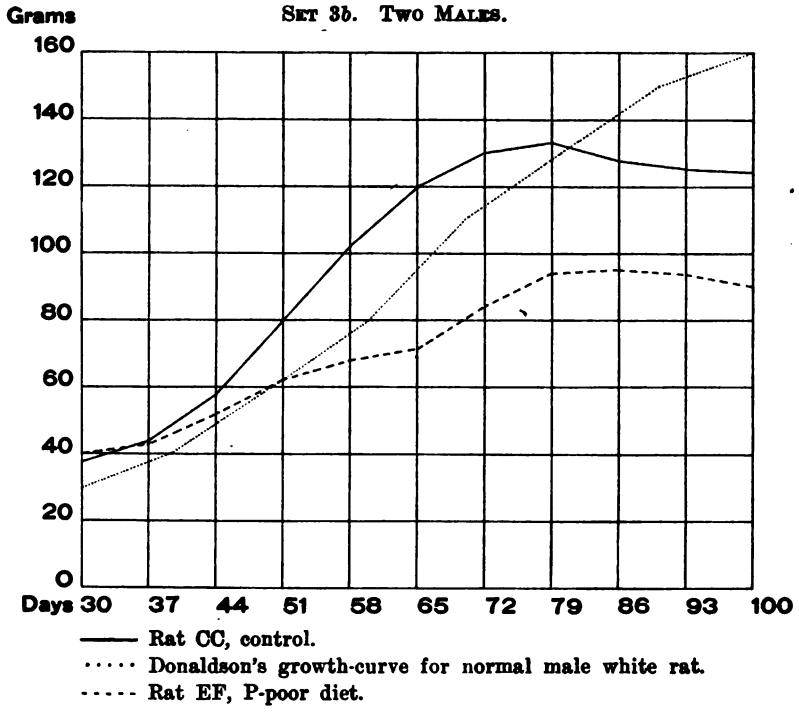

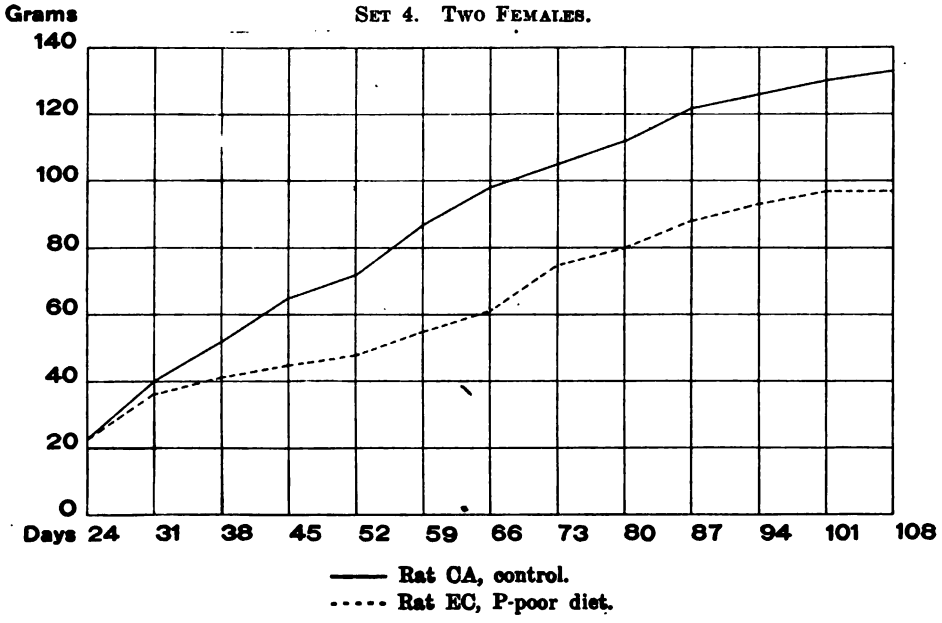

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DISCUSSION.

Dr. F. H. McCRUDDEN, Boston, Mass. I have very little, almost nothing, to say on the paper. Last year I had the pleasure of talking here, and I had something in mind at that time that I wanted to say. I had been working on the metabolism of bones, and made no progress in the work until I came to the conclusion that bones are not dead tissue, but that they are undergoing metabolism. When I began the work, bones were considered dead and not as undergoing metabolism, and I worked for two or three years before I came to the conclusion that bones are undergoing metabolism the same as are muscles and other organs. When I came to this conclusion, some of the points that had troubled me a good deal were cleared up by working from that standpoint. Last year when I spoke here I was glad to present that point of view, in the belief that, perhaps, with that consideration in mind, some of the problems regarding teeth might be viewed in a rather different light. I was so much interested in what was presented last year that I came again this year to hear Dr. Gies, and today I was very much interested. I do not know whether dentists appreciate what the work of Dr. Gies means. In so modestly saying that after two years' work his results were rather negative, he seemed to imply that they had not made much progress—I do not think that is a fair statement of the case. I think the work he has been doing is perhaps the most important fundamental work that is being done in research in dentistry at the present time anywhere, because it involves such a fundamental problem in the physiology of the teeth. It brings out that question regarding the teeth that I have faced regarding bones—whether the teeth undergo metabolism. I do not know what the viewpoint of dentists in general is, but the impression seems to be that the teeth are laid down early in life like dead pegs, and stay there unchanged throughout life; that they are not living tissue like the muscles and bones. That question has seemed to me an extremely fundamental one, because it must affect the whole viewpoint regarding the physiology of the teeth, the pathology and treatment of teeth.

What evidence there is that teeth undergo metabolism I do not know. I presented the results concerning bones with the hope that perhaps dentists might have some evidence on that line regarding the teeth. It would be very difficult to look over the literature and find any evidence on that point; it would be for me, at any rate, although I am interested in the subject. However, in the last year or so, I have come across one or two papers, one on the chemical composition of the teeth, in which it was shown that as the teeth grow the content of calcium is increased and the content of magnesium decreased. The percentage of calcium increases from 52½ in the first molar to 55 in old age, and the magnesium decreases from .84 to perhaps .66. These figures are similar to those obtained in analyzing bones at different stages and the results are in accord with the view that teeth, like bones,

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undergo metabolism. I also came across a paper by Professor Dependorf, professor in the University of Leipzig, published in the *Deutsche Monatsschrift für Zahnheilkunde,* in which he studied the distribution of the nerve fibers in the teeth. He criticizes the previous work done along that line; he says that Morgenthal and a number of others who believe they have found nerve fibers in dentin used faulty technique, and says they did not demonstrate these fibers, but he demonstrates by the silver method that nerve fibers do pass from the pulp into the odontoblastic layer and there spread out and reach the junction of the dentin and enamel. This question of tooth metabolism, if taken on teleological grounds, must mean that dentin is undergoing metabolism; there can be no other reason for nerve fibers there, except to control nutrition, and if teeth have blood supply, they must undergo metabolism, material must be continually built up and broken down. I came across another paper by Feiler, read at Frankfurt, in which he states that teeth do undergo metabolism, that he has histological evidence of it, even in enamel, and states that the nutrition of the enamel comes from the outside and passes through the tooth into the interstices between the enamel rods. Dr. Gies' work, especially, it seems to me is in harmony with the view that teeth undergo metabolism, first in showing in the drying-out of the teeth that substances can pass outward, and on the other hand, in the experiments with trypan blue, showing that material can pass from the inside, not only through dentin but through the enamel.

What I wish to emphasize at this time is the fact that Dr. Gies' work is splendid; that instead of finding really negative results and having a negative report to make at the end of two years, he has really done most excellent work. The whole problem is exceedingly difficult. In the metabolism of bones one can study the intake and output, but the teeth are made up of such a small portion of lime-containing substances that metabolism is not shown by ordinary studies, and some very ingenious experiments such as those devised by Dr. Gies will have to be carried out to throw any light on that particular point.

Dr. D. W. McLean, Mt. Vernon, N. Y. We should indeed be proud of the work done by Dr. Gies and his associates during the past year, and it has pleased me very much to hear Dr. McCrudden's appreciation. I feel very strongly that we dentists do not appreciate the importance and significance of this work. After hearing this paper we cannot but appreciate the thorough and systematic way in which Dr. Gies has gone about his investigations. If you will stop to consider that he is working in a new field, that he has nothing of any kind to help him, that he is feeling his way, and that each experiment has to show its own shortcomings and suggest possibilities for future work, you cannot but realize the intense study he has given to this work, and the great amount of time he has placed at the disposal of this society without any personal return whatever.

I was very much pleased to hear Dr. McCrudden go into the question of metabolism of the enamel, for I firmly believe that active metabolism of the enamel does go on. In the past we have taken the stand that enamel is laid down from the outside, that after the tooth has erupted and the enamel organ has disappeared, the connection between the

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circulation and the enamel is entirely lost, and that therefore the enamel cannot change. It stands to reason, of course, that no new enamel can be laid down from the outside, but this does not mean that no chemical or metabolic changes can take place. We have known always that during the years in which our patients attain maturity, and during the periods of gestation and lactation the teeth become soft. We know also that during life the teeth become harder, and that as patients advance in age the teeth become brittle and have an increased tendency to fracture. This can only mean that there is metabolism taking place, not only in the dentin but in the enamel.

Just consider for a moment the possibility of the enamel remaining absolutely fixed from a chemical standpoint. We are constantly telling our patients that during gestation the teeth become soft, because lime is removed from the teeth for the construction of new bone, etc. Now, if lime is removed from the teeth for the construction of new bone and removed only from the dentin, and the enamel remains unchanged, why do we have ravages of caries during this period? If the enamel remained hard and impervious, no matter how much the dentin might be softened, we should not have widespread caries and other evidences of softened enamel during gestation.

It stands to reason that we can have metabolism; we may not have direct contact between the blood current and the enamel, but that is not necessary. Directly beneath the enamel we have the interzonal layer, made up of interglobular spaces which closely resemble the lacunæ of bone and contain organic matter. Running out from the pulp we have the dentinal tubuli, and these tubuli branch and terminate with other branches in these interglobular spaces which are in direct contact with the enamel. We know that protoplasmic processes from the odontoblasts of the pulp pass out through these tubuli and terminate in the interglobular spaces in direct contact with the enamel.

Now, we know that the tissues of the body get their nourishment because the fluids of the blood undergo extravasation and pass out from the bloodvessels and through the intercellular spaces around the cells and their protoplasmic processes and nourish these cells. These fluids contain calcium, magnesium, phosphates, and other materials entering into the upbuilding and resorption of bone, dentin, and enamel. If everywhere else in the body these fluids escape from the blood currrent and nourish the cells, why can they not pass into the intercellular spaces of the pulp tissue and out through the tubuli into the interglobular spaces for the nourishment of the enamel? To be sure, I cannot prove that this happens, but I firmly believe that you cannot prove that it does not happen.

Research work of this character is of vast importance to us, and I believe that fifteen years from now anyone looking back over the proceedings and the history of our society will find that Dr. Gies' work overshadows much which some may now consider more important. We may devote our time to the developing of the proper technique for root-canal work and to kindred fields, and it is well to do so, but this work goes deeper, and if Dr. Gies' research is successful, and we can apply it in our prac-

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tice, these operations will become largely things of the past.

The slogan of today is prevention, and this research work is of special importance because it is the key to prevention in dentistry. I was greatly impressed on visiting Hartford last month and attending the Connecticut State meeting to see the progress that is being made along the line of prophylaxis—another great step toward prevention. They are making wonderful progress in this direction, and I tell you, gentlemen, New York will have to hustle to keep up.

You cannot but notice the success that has been attained in medicine along the line of prevention. You know how few cases of smallpox we have now, how few pockmarked patients we see today. In crowded New York City we had not one case of typhoid reported last month. Yellow fever is now under control, and this has made possible the building of the Panama Canal. Incidentally we know that two men gave up their lives in carrying on the yellow fever experiments. Dr. Stein told us this morning of two students in one of the European universities who voluntarily permitted themselves to be inoculated with germs of syphilis, and who established the fact that if taken in reasonable time, the spread of this disease can be stopped. These students did not develop the disease, but how many men here would like to take the chance they took?

This research work, this preventive work and the sacrifice which attends it, have dignified and enobled the medical profession. We talk much and have talked more in the past of the failure of the medical profession to realize our importance and our dignity, and I ask you frankly why such a profession should be eager to claim kinship with men who have been content to jog along as "mere pluggers of holes." Our profession has wonderful opportunities before it, but their realization means that all must contribute some of their time and energy, and some of their financial support.

Dr. F. W. Low, Buffalo. Though I did not hear the remark myself, I am told that one of our learned legislators, in speaking of the appropriations that had been made by the state for medical research work, especially relating to cancer, said that they had been at work on this question now for eight or ten years, and had not accomplished anything, therefore he thought it was time for the state to stop the appropriations and close the laboratories. Now, the moment we find what we are looking for it will be time and perfectly proper for us to close the laboratories, but until that time arrives we have to continue, as the last speaker said, to put our hands in our pockets to support this work, because we are not competent to do it ourselves. Last year when I was called upon to discuss the report by Dr. Gies I said that I thought it was better and more modest for me to sit in silence. I was only called upon because I had done a little very crude investigation myself in an entirely different line of study. As to the secretions of the glands and their effect upon bone metabolism or tooth metabolism, we shall find—unless I am very dense—when the time comes that we have more definite data and conclusions, that they are coincident, and controlled by the same processes, whether it is tooth or bone structure.

All that I wish to say tonight is that I hope if there is any member of the State Society who has not subscribed to the

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fund of the National Dental Association that they will do so. As I understand it, every penny that this society appropriates to the National fund has been expended in investigations going on in New York, and if we cannot support the work, whether we are able to comprehend all that has been said here today or not, if we cannot support the movement under the supervision of scientists and men of culture and attainment, we have no right any longer to class ourselves as members of a liberal profession. We had better call ourselves mechanics, and next year when we are invited to attend the state medical meeting, let our reply be that we have no legitimate right or interest there. We were invited for the first time this year to attend and enter the discussions of the state medical society meeting, and they devoted considerable time at that meeting to discussions regarding the teeth.

(Dr. Gies not being able to remain until the close of the discussion, the society voted the privilege to Dr. Gies of closing the discussion if he so desired, to be included with the printed report.)

Dr. GIES. The remarks of the gentlemen who participated in this discussion are appreciative beyond anything we deserve. It is a very great satisfaction, nevertheless, to note the approbative character of the comment on our efforts. We shall endeavor, by further experimental study, fully to meet the expectation that both scientific and practical results of value will accrue to dentistry from research in this field.

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A Consideration of Some of the Present Tendencies in Dentistry.

By C. N. JOHNSON, M.A., L.D.S., D.D.S., Chicago, Ill.

THIS paper is not intended as an effort to harness enthusiasm or to put a brake on progress. It is merely an invitation to the thinking men of the profession—possibly it might be better to extend the invitation to the unthinking men in the profession—to consider somewhat carefully certain tendencies which seem particularly apparent at the present time, and which your essayist believes would be the better for a rather rigid and unbiased interpretation.

ANALGESIA.

A year ago I had the honor of standing on this floor, and remarking in a discussion of the splendid report of your Correspondent that the practice of analgesia with nitrous oxid and oxygen did not appeal to me as a routine and regular method of procedure in filling teeth. In taking this position I found myself opposed to the opinion of some men prominent in the profession, and for whom personally I had a very high regard; but I take it that it should be a tenet of every man's professional faith that in the discussion of scientific subjects the matter of personal predilection should not be permitted to dominate a man's expression of opinion. What I thought of analgesia then I still think of it, and it may not be amiss for me to venture on a brief explanation of the reasons why I am in a measure opposed to it. I say advisedly "in a measure," because I would not have it inferred that I am sufficiently hidebound in my convictions that I fail utterly to see any virtue in a method which has for its aim the amelioration of suffering during dental operations. I will go even farther, and admit that there may be some cases which cannot be so successfully controlled by any other means as by analgesia. And yet to my mind these are only the exceptions which prove the rule, and these exceptions do not in any measure alter my conviction that the general introduction of analgesia for the ordinary operations which we perform each day, such as cavity preparation, trimming roots for crowns, etc., would do infinitely more harm than good.

My reasons for making this statement are based on several considerations: (1) The impracticability of the process —a charge which I have never before

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seen made against it; (2) the possible detrimental effects on the patient; (3) the danger of approaching too close to the pulp in cavity preparation, and (4) its demoralizing influence upon the stamina of the patient.

As to its impracticability, it is only necessary to note the fact that many of the operators, it is quite safe to say, who took it up most enthusiastically in the beginning, use it less and less as time elapses. The chief reason for this must be that it is not practical; that it has certain limitations which interfere with its successful operation. After these years of testing-out, if it were practicable it would be used more to-day instead of less. There is something wrong with a method of practice which steadily loses ground after the crucial test of experience.

Its possible detrimental effect on the patient may be manifested in various ways. When patients are kept partially under the influence of an anesthetic for a sufficient time to permit of cavity preparation or similar operations, and when this is done as routine practice, it is difficult to estimate the injury that may result. To say nothing of the headaches which are frequently complained of by the patient, there is another factor not usually considered, but which is really worthy of some attention, viz, the possible effect on those patients whose blood pressure is high, many of whom are not aware of this condition till something serious has happened. It is not well to cry "Wolf, wolf!" at the suggestion of every new method of practice, and yet with a thing as radical as analgesia the operator should proceed with great caution lest he permanently injure his patient.

The danger of approaching too near a pulp in cavity preparation is not a fanciful one, as has been demonstrated in several instances which have come under the writer's observation. I have seen at least two cases where pulps were needlessly exposed under analgesia, in each of which it was found necessary to remove the filling on account of pain, only to find the pulp dying. These were both in cases where the cavities were so small that there would have been no exposure if analgesia had not been used. This cannot be considered desirable practice.

Another unfortunate feature of analgesia is that it caters to the dependence and lack of stamina of the patient. I do not by any means argue for the infliction of pain to develop courage on the part of the individual. But I do assert that in most of the routine work of dentistry the pain need not be so great that it works an injury to the patient or calls for a systemic numbing of the nerves, and that the lure of this practice held out to people will in many instances tend to minimize their self-control, and unfit them for meeting some of the other emergencies of life when they are thrust upon them. If we could insure every individual that he would never be called upon to endure hardship of any sort there might be some justification for humoring his every whim, but this is against all human experience, and the pampering of people beyond a reasonable limit is demoralizing in every way. I am aware that I shall be misunderstood, and mayhap misquoted in venturing this statement, and so I must hasten to make it clear that I am an advocate of the utmost consideration and kindness in the treatment of people when they are obliged to encounter disagreeable experiences such as the performance of dental operations.

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Indeed, my chief contention is that there has not been sufficient consideration and kindness in the past, a fact which in part is accountable for much of the dread of the dental chair. Had dentists always been considerate, careful, and skilful, there never would have been any demand for such a practice as analgesia for filling teeth, and my advice to the dentist of today is to go back to the old-fashioned tenet represented by painstaking care, kindness, and delicacy of manipulation. If he will couple these with a constant study of human nature, he will meet all the contingencies of everyday practice without resort to so radical a procedure as analgesia.

PROPHYLAXIS.

In considering the tendencies of the day it may be well to refer briefly to the method of practice so extensively known as "prophylaxis." The very name appeals to one as a most commendable thing in dentistry. To prevent disease is more laudable always than to cure it, and our chief efforts should be centered in this direction. But in his wildest day-dreams the man who first called attention to this practice, Dr. D. D. Smith of Philadelphia, never imagined the extent to which it was to be carried by some practitioners. To conscientiously remove deposits from the teeth and polish the surfaces smooth and bright where they have become stained and roughened is a legitimate and altogether worthy method of practice; to stimulate patients to better care of the teeth, and to have constant surveillance over conditions in the mouth by frequent stated inspections must be considered a policy of reason and conservation. But to ruthlessly go into a mouth with stones and disks and strips, and to grind and cut and slash as is being done by some operators is wholly unwise, and in certain instances borders almost on malpractice. To pass a sandpaper strip between the proximal surfaces of teeth whose only sin is that they are somewhat stained, and to saw this strip back and forth in the interproximal space, lacerating the gum to shreds, and cutting into the tooth tissue in the gingival region; to go even farther than this, and force the strip between the bifurcations of roots, with the idea of trimming down and polishing these surfaces, is to exceed the function of rational prophylactic treatment, and in many instances to do more harm than good. This laying bare of the necks of the teeth by grinding and the use of abrasives frequently leaves the teeth so sensitive that the patient is rendered extremely uncomfortable. There is no need for creating this discomfort if the operator will go about his prophylactic work with reason and judgment, removing the deposits most carefully with delicate instruments, and polishing and smoothing the tooth surface without cutting and slashing into it as if it were so much inert matter. To transform a mouth from a state of disease to one of health by prophylactic treatment, and to do it rationally, is a process extending over some time instead of a radical and immediate operation of the "presto!—change" character. And this can be done without subjecting the patient to intolerable pain or subsequent discomfort.

Another consideration connected with the practice of prophylaxis relates to the folly of instituting treatment of this sort in a perfectly healthy mouth. This is frequently done on the plea that it will prevent disease of the gum and decay of the teeth, and the promise is con-

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fidently made by the dentist and naïvely accepted by the patient that if prophylactic measures are followed once a month there will never be any caries or pyorrhea in that mouth. The burden of preservation is thereby placed upon the dentist instead of being placed where it properly belongs, upon the patient. It is the daily care the patient gives the teeth, rather than the monthly care of the dentist, which counts most for the maintenance of health, and this should always be emphasized in any discussion of the matter with the patient.

Not only this, but to institute so-called prophylactic measures in a mouth where the gums are normal and the teeth in need only of ordinary cleaning is likely to do decided harm. To lacerate these delicate gum margins by instrumentation is in many instances to start them on the road to the very diseases which the dentist is so anxious to avoid; in fact, one of the functions of the dentist today is to guard his patient against injuring the gums by injudicious or wrong use of the brush in the patient's own hands. It is as valuable to teach the patient how to properly care for the teeth himself, so that he may do his part successfully, as it is for the dentist to operate skilfully in doing his part.

Then, again, to promise a patient that there will be no decay of the teeth if prophylactic measures are instituted each month is a hazardous thing to do. In some mouths where the influences of susceptibility are especially active, cavities will occur at times despite our best efforts, and when this happens it must call for some very ingenious explaining on the part of the dentist. Fortunately for themselves some of our colleagues are really very ingenious at this kind of explaining; but it would assuredly be better for their subsequent equanimity if they were frank enough at the outset to say to their patients that, while prophylaxis was a most excellent procedure under its proper indications and would aid greatly in minimizing the tendency to decay, there was yet no panacea or absolute preventive for dental caries known to man. This would be safer and I venture the assertion that it would not lessen the ultimate respect the patient has for the dentist or for prophylaxis.

PYORRHEA ALVEOLARIS.

To proceed from a consideration of prophylaxis to that of pyorrhea alveolaris seems a natural sequence, in view of the close connection between prophylactic treatment and the prevention of pyorrhea. There can be no question that the proper observance of prophylactic measures in mouths where the incipience of pyorrhea has manifested itself will be of immense value in limiting the disease. Indeed it may safely be said that with all the furor in the way of systemic treatment, either by the vaccines or by the much-heralded emetin, the chief reliance for the control of pyorrhea must rest at present with proper local management of the case. And this at once brings us face to face with the question as to whether or not emetin is living up to the great promise made for it in the beginning. If we study the history of the use of this remedy we will see repeated the experience of many other remedies for many other diseases. When emetin was first introduced by Drs. Smith and Barrett of Philadelphia, their claims for its use read quite conservatively, and while their reports seemed to show a very encouraging result, yet there was a cautious tone to all they said, which if heeded by the profession would have

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resulted in a saner acceptance of the remedy. But while Smith and Barrett stated that emetin "seemed" to bring certain results, some of those who followed them stated that it *did* bring these results, and worse yet, certain men got the ear of the public press and heralded the glad tidings that at last there was a specific remedy for that almost universal disease—pyorrhea alveolaris. As my good friend Dr. Hofheinz of Rochester remarked, "There seems to have developed a widespread impression that the only thing to do to cure pyorrhea is to inject emetin into the patient."

At this stage of our experience it seems difficult to assign to emetin its proper status as a remedy for pyorrhea. Some men continue to report encouraging results from its use, while others just as careful and as skilful see little of merit in it. There is one confusing feature of this question which should be cleared before any estimate is passed upon the virtue of a drug or method advocated for pyorrhea. The claim that a certain treatment will stop pus formation in the mouth is no evidence that it will save teeth from being lost through failure of the supporting structures of the teeth. In fact I am going to be sufficiently heretical to say that the problem of stopping pus in pyorrhea pockets is not and never has been a very serious one, provided the operator may have the co-operation of the patient. And this can be accomplished wholly by local treatment. The great problem, and the one which I believe to be baffling most men today, is to prevent the constant and insidious loosening of the teeth by a solution of the pericemental membrane and alveolar process without any evidence of pus formation at all. This goes on in some cases despite the most careful local treatment that we are able to institute. It is a condition in which other things are involved than the mere presence of deposits, because the deposits may be removed as carefully as can be done by the hand of man, and yet the teeth grow steadily looser. It is light upon this peculiar condition that we need more than anything else today, and when this light comes I venture the prediction that it will be found to be something systemic; and to go one step farther, I imagine that it will have to do with some form of faulty metabolism or elimination.

The most unfortunate thing connected with the present status of the emetin treatment is the false hope that has been fostered in the mind of the public that a panacea for pyorrhea has been discovered. Quite naturally those afflicted with this disease will catch at any straw which promises salvation, and the confident way in which the papers have stated that a simple cure has been found will mislead many people, and result in their ultimate disappointment. Any deception of the public which has the semblance of exploitation reacts in an unfortunate way, and increases distrust which is hard to live down. The best interests of the profession and the people are conserved only when there is perfect confidence established on both sides, and experiences such as we are having with the emetin treatment are not conducive to this end.

ROOT-CANAL WORK.

The intense interest which has been excited in recent years regarding the possible effect on the system of badly treated pulpless teeth has stimulated the profession to renewed efforts in

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the direction of better root-canal work. This is a movement in the right direction, and it came none too soon to save the reputation of the profession. The numerous travesties on root-canal fillings that have been made to pass muster heretofore would be a serious reflection on the profession had the real gravity of the situation been apparent. Few men realized that anything more disagreeable or dangerous than an alveolar abscess was likely to follow bad root-canal work, and so slipshod methods were allowed to prevail with many operators, who were content if their treatment did not immediately result in the formation of an active abscess. But the severe and justifiable strictures passed upon this kind of dentistry by the medical profession and by a certain section of the dental profession has "given us pause," and made us reflect that an improvement in our operations must be made if we are to save our reputation. It is safe to assume that there has never been such a general awakening as there is at present on the subject of proper root treatment and filling, and a close study of the technique of this operation is being more generally made than ever before.

This is by no means an acknowledgment that in the past this work has been entirely neglected or ignored by the profession. Many men from the very beginning of the practice of root-filling have devoted their best energies to it, and have conscientiously lived up to the highest of their understanding. In the hands of men of this type there has been little menace to the welfare of the patient as the result of root-filling, and the present crusade is directed mainly against that large membership who slight this operation, and content themselves with any kind of technique that will cover up their tracks temporarily. The strongest censure that can be passed upon this sort of work is none too severe, and the united efforts of the profession should be devoted toward the elimination of such methods of practice.

But let us turn for a moment to the other side of the picture. There is grave danger at the present time that serious harm is to be done in the name of so-called reform. It seems to be a proclivity of human nature not to be able to bring about any reform without overdoing it, and in some instances the enthusiasm of the reformer leads him into follies as serious as the evils he is trying to combat. When the realization was forced upon the profession that neglected or badly treated pulpless teeth were a menace to the health of the individual through establishing local foci of infection which might affect the entire system, the chimeric vision of some men carried them on to the conclusion that every pulpless tooth was a menace, and consequently should be removed. In the light of our long experience with the behavior of well-filled pulpless teeth it seems impossible of belief that men can be found who sagely advise the extraction of every tooth which by any chance has lost its pulp, and yet this is really being done today in certain sections. Not only this, but dentists are reading papers before medical societies extolling the practice of extraction, and dwelling on the horrors lurking at the apex of every pulpless tooth. Medical men are naturally only too glad to discover some new explanation of the phenomena of disease which have been puzzling them, and they readily seize on the novel theory that the teeth are at the basis of many of the ills from

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which their patients are suffering, and which heretofore they have been unable to fathom. No conscientious man of mature experience would for a moment wish to minimize the ill effects on the system of bad mouth conditions, nor to argue that foci of infection at root-ends were not a serious menace to the patient; but to claim that all pulpless teeth, regardless of whether they were well filled or not, are dangerous to the individual and should be removed is simply to run riot with the evidence of half a century, and to throw ordinary common sense to the winds. The consequence of this crusade of extraction will be disastrous to the people if it is not checked. Hundreds and possibly thousands of teeth innocent of any harm will be sacrificed to the forceps and the people be deprived of their use for life. To accept the dictum that most of the teeth which have lost their pulps cannot be made healthy and useful to the individual is to set dentistry back more than fifty years—to the days when pain in a tooth meant its extraction, when partial dentures followed shortly by full dentures were the rule. Why is it that today there are relatively fewer artificial teeth worn by the population than there were years ago? Mostly it is due to the fact that it has been possible to treat and save pulpless teeth.

As has already been intimated, we need a new consecration to care and thoroughness in the technique of this work, we need to increase our effort and improve our skill; but to say that all this is futile and that when a tooth has lost its pulp it must ever remain a dangerous thing to the patient is to discount and discredit the splendid work done in this line by such men as Callahan, Rhein, Buckley, Best, and scores of others.

Medical men should be taught to be more guarded in their condemnation of teeth. If they are to continue to advise extraction on the evidence of the X-ray as they are doing today, then we must insist that they make themselves more familiar with the phenomena of X-ray pictures of the teeth and jaws. Skiagraphs of the jaws are difficult to properly interpret even by an expert in this especial field, and for one who is not familiar with this work to pass an offhand judgment on a tooth and order its extraction is often to do irreparable injury to the patient.

We should welcome the closest cooperation between the physician and dentist, but we should insist that this co-operation be undertaken solely for the best interests of the patient instead of for the exploitation of some pet theory.

In considering some of the present tendencies in dentistry your essayist has sought to touch on a few of the outstanding things which seem to him to be affecting our profession at this time, and he wishes to repeat what he said at the beginning, that his aim is not to discountenance progress nor to discourage the testing of new ideas. It is only by the introduction of new ideas that the profession can grow, and while the trend of thought and practice in some of the things mentioned in this paper would appear to call for a halt in the enthusiasm of those most interested in them, yet the writer would rather see the extreme of enthusiasm, even with the mistakes concomitant thereto, than to see the profession settled down into a stagnant rut, self-satisfied, and asleep. Good must eventually come from the extremest method of practice, and the only care we must have is to see that too much harm shall not be permitted to creep in with the good.

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DISCUSSION.

Dr. R. H. HOFHEINZ, Rochester. I have been both fortunate and unfortunate enough to discuss numerous papers of Dr. Johnson, and I am confronted with the same difficulty today.

It is easy to disagree with a writer and then discuss the disagreement, but it is most difficult to agree with an essayist and discuss the agreement. The most and best anyone can do is either to assume a fictitious attitude or elaborate on the essayist's paper. Not being talented for the former task, I will do my humble share toward elaboration.

The essayist's first subject is that of analgesia. To be totally opposed to any method of some intrinsic value is, to say the least, unscientific; equally as unscientific is it to apply this same method in every instance. A number of us remember well the use of cataphoresis; what a blessing it proved in the hands of the careful operator, and what a curse it became in the hands of the careless. The impracticability of its use was probably the strongest reason why it was discarded with the many utopian methods which preceded it, and this may also be the prime cause why the use of analgesia is growing less. Everybody knows what a craze swept over the ranks of the dentists when cataphoresis was introduced; everyone knows that it made its exit in a very unostentatious manner. Will analgesia fare any better? The old and safe methods, together with the desensitizing paste of Dr. Buckley, are pressing it hard.

Among the numerous deleterious consequences, Dr. Johnson mentions the dangers to patients with high blood pressure. During the discussion on this subject at the Seventh District Dental Society, one gentleman made the statement that a physician was carefully watching the high blood pressure of a patient who was under analgesia, and found it considerably reduced instead of increased. This would neither coincide with Dr. Johnson's views nor with general physiology, and I should be very glad to hear more on this subject.

The danger of approaching too near the pulp during analgesia applies with equal force to any agent that lessens the pain of excavation. Even the best dental anatomist who is more or less obliged to work hastily, and whose attention is drawn away from the painful operation, is apt to make this mistake. In my opinion one of Dr. Johnson's strongest arguments is that "The application caters to the dependence and lack of stamina of the patient." We all know how ready the physician is to administer morphin. The result is that we have probably more morphinists than any other civilized country, and will have them in spite of the stringent law just passed in the State of New York. Our nervous race certainly does not need the infliction of unnecessary pain, but they need the fact emphasized that we cannot go through life as smoothly as we would like to. Every individual must go through a school of hardship which will prepare him for struggles of both a physical and psychic nature, in which analgesia is of absolutely no account. The few isolated cases do certainly not

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recommend it to all of us under all circumstances. It will find its proper use after it has done enough mischief, and it will then take a proper place among the many dental helpmeets.

Dr. Johnson's next subject is that of prophylaxis. He tells us what he considers conservative prophylaxis, and that seemed to me all there was to prophylaxis, though I have noticed at dental clinics that the operators removed stains with scalers and disks, where dioxid and pumice, together with a little more elbow-grease, would and should have accomplished all conservative prophylaxis.

The essayist waxes eloquent, however, when he speaks of prophylaxis bordering almost on malpractice. He tells us of sandpaper strips being run between the proximal surfaces, lacerating the gums to shreds and cutting into the tooth tissue in the gingival region, of the laying bare of the necks of the teeth by grinding and the use of abrasives. I do not care to open the subject of extension for prevention, which has proved a blessing in the hands of conservative operators. We know how terribly it was overdone, and how many pulps were unnecessarily sacrificed. I have seen plenty of the latter cases and most violently protested against such dental work, as did Dr. Johnson. I gladly confess, however, that the kind of prophylaxis Dr. Johnson refers to I have not seen, at least not in this section of the country. It would certainly be easier for these gentlemen to bathe all the teeth in muriatic acid; it would help them both physically and financially. The frequent or call it monthly prophylaxis in a healthy mouth, such as Dr. Johnson has described and censured, to prevent all future decay seems as utopian to me as it does to him. He is only too correct when he tells us that the burden of preservation of the teeth is thereby wrongly placed upon the dentist instead of where it properly belongs, on the patient. No gums and teeth can be more perfectly made than those made perfect by nature itself. Not all teeth can be kept free from decay by any amount of prophylaxis. What about sudden changes in the chemical composition of the saliva? What about general diseases and their influence upon the teeth? No amount of prophylaxis can prevent teeth from decaying under such conditions, especially near the gum line, either proximally, bucally, or lingually. I agree with the writer that there is no panacea or absolute preventive for dental caries, excepting to the super-enthusiast or the fool.

Pyorrhea alveolaris is the next subject which is placed under the essayist's critical lens. This subject alone could easily fill three evenings and then show absolutely no signs of exhaustion. Dr. Johnson, however, approaches the subject from the therapeutic side—the emetin and ipecac aspect principally. He is certainly right when he states that "With all the furor in the way of systemic treatment either by the vaccines or by the much-heralded emetin, the chief reliance for the control of pyorrhea must rest with proper local treatment." Of all therapeutic treatments, however, be they local or systemic, ipecac or its active principle, emetin, has thus far to me shown the most powerful influence. The claim for the drug that it will cure all cases of pyorrhea is just as utopian as all other extreme claims. For years we dentists fought for recognition regarding mouth conditions influencing systemic disease. The physicians received us with a superior smile.

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We are now drifting to the other extreme. Every disease which cannot be easily diagnosed nor readily cured must have its source in dental lesions. Miller in his "Micro-organisms of the Human Mouth," 1898, tells us that Galippe found in the tubules of a tooth attacked by what he termed "infectious arthrodental gingivitis" a parasite designated by the Greek letter η. Subcutaneously injected into guinea-pigs it produced after fifteen days, in the joints of all their jaws, a series of abscesses which made all motion impossible. The parasite showed a preference for the osseous system. Miller tells us that participation of parasites is incidental to the disease. Many reports go beyond the seeming process of Dr. Smith and Dr. Barrett, however.

Recently Dr. Julien Zilz, in the *Zahnärztliche Rundschau,* told us that he made a study of one hundred patients suffering with diabetes and found that in 47.8 per cent. pyorrhea was present. Dr. Evans and Dr. Middleton found the amœba present in every one of the fifty-four cases they examined, and observed marked improvement after the use of emetin in 1/2 per cent. solution in infected sockets. The editor of the *American Journal of Clinical Medicine* tells us that Evans and Middleton found that out of seventy cases of pyorrhea, fifty-two displayed constitutional symptoms, most of them having disturbances of the joints. The great question to be solved is, Which is cause and which is effect? If the endamœba found in pyorrhetic pockets is almost always found in the intestinal tract, and if ipecac in any form is a destructive agent of it, let us use it by all means. It is no new remedy. In connection with intestinal disturbances it has been used in China for hundreds of years. Only a few days ago, a friend of mine who has lived in China for many years told me that his wife suffered largely from amœbic dysentery, and, in spite of the ipecac, lost all of her upper teeth.

A most serious case of Vincent's angina came under my treatment a few weeks ago. A thorough scaling by Dr. Bradshaw, our specialist, and the administration of alcresta ipecac tablets, 2.10 gr., three times a day, brought about a wonderful result within six or eight days. An equally rapid and remarkable result I saw in the office of my *confrère* only two days ago. I had more negative results than positive ones. This must not discourage us. It only demonstrates how much we are in need of dental scientists.

Root-canal work is the next subject Dr. Johnson touches upon. If ipecac is going to revolutionize the treatment of pyorrhea, the roentgen ray will certainly do the same in root-canal filling operations. It would be interesting to know the percentage of the many unscientific root-canal fillings of cotton, asbestos, etc., which, after many years, show no sign of pericemental complication or alveolar abscess. Only a few years ago some of the greatest scientists resorted to cotton for root-canal filling, evidently with good results. We look askance at the man who does anything of that kind today. Cotton days have passed; root-canal fillings of gold belong to history; gutta-percha cones carried to the apical foramen, and through it, are now in order. Quite two years ago Dr. Gillett read a paper regarding the need of an X-ray apparatus in every office. I was one of the men who opposed that wholesale use, and earnestly believed that dental radiography could readily be done by the general radiographer.

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Though I am far from being an extremist, I believe today that it is part of a complete dental instrumentarium. It seems as great a folly to extract a tooth when it has lost its pulp as when pyorrhea has attacked it. Both cases are curable, and many radiographs which show a dark outline at the apical foramen do not necessarily indicate pus, though they may indicate tissue changes and even the previous presence of pus to which the disintegration is due. Pus can only be diagnosed by the microscope, and we are only too often willing to jump at conclusions. We, as dentists, are drifting into a danger zone with the physician who may hereafter try to cure all pyorrhea with emetin, diagnose all dark areas of the radiograph, etc. Some of us may not be as skilful as Dr. Rhein in determining the trifle of gutta-percha which has passed through the foramen and becomes encapsulated, yet I would rather take a chance of pumping too much through the root-canal than to preserve the entire tooth in alcohol or in the rubbish barrel.

It would be interesting to have Dr. Johnson explain his method of treating tortuous root-canals with formocresol and zinc oxid. It is true that thousands of root-canal fillings would look like the work of a freshman if radiographed today. We erected many gravestones where we thought we were building monuments of joy everlasting. Dr. Johnson's entire paper, aside from its advocacy of conservatism, advocates what we fought for a long time—namely, the intelligent co-operation of physician and dentist. The physician who undertakes the treatment of diseases of the oral cavity, or any other disorders dependent on pus germs, without consulting the dentist, commits a grave professional error. The dentist who can diagnose pus without taking a culture shows his ignorance. The dentist who has neither time nor skill to treat pyorrhea and does not possess the patience to manipulate root-canals, may well say with Cassius, "The fault, dear Brutus, is not in our stars, but in ourselves that we are underlings." A learned man in our day is a man who knows everything of something and something of everything, but he must be able to do something well and thoroughly.

Dr. C. J. GRIEVES, Baltimore, Md. Dr. Hofheinz's discussion pleased me almost as much as Dr. Johnson's essay, and I too, like Dr. Hofheinz, find it difficult to discuss a paper with which I agree, and I can only attempt to emphasize some of the arguments which the essayist has advanced.

Taken *seriatim,* I do not believe the subjects could be more successfully set before us than Dr. Johnson has done, particularly his conclusions about nitrous oxid and oxygen analgesia in regard to systemic dangers and the moral side of the question.

As to prophylaxis, I have gotten myself into trouble with Dr. Hyatt, Dr. Rhein, and also Dr. Fones in regard to the slogan that "Clean teeth never decay," but I think Dr. Kirk agrees with me in the statement that clean teeth, so far as we are able to clean them, do decay. I would like to point out, however, that, while we cannot prevent decalcification of the enamel—which I am not by any means convinced is always decay, although it may lead to decay—because I am a firm believer in the internal secretion theory—we *can* prevent decay of depth and pulp exposure by prophylaxis; and that is a great step. We can prevent periapical infection and

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pulp exposure if we cannot prevent incipient caries.

It is dangerous to approach the question of pyorrhea at any time, particularly in the present stage of the emetin treatment. Like Dr. Hofheinz, I believe that I have seen results from this treatment. Dr. Johnson has justly emphasized the importance of the work of Dr. Barrett and Dr. Smith. I saw the inception of this work and was fortunate enough to be present when Dr. Barrett presented his first paper. Before the presentation of his paper, Dr. Barrett would not commit himself at all as to which particular endamœbic form was responsible for pyorrhea. A great many factors in the etiology of this disease have not been elucidated sufficiently to furnish a solid basis for claims in regard to treatment, and the same is true with regard to many other pathological conditions. For instance, if the amœbæ are responsible for this condition, it should be possible to make a germ inoculation and produce pyorrhea. This can be done with other pathogenic organisms. I am not questioning the value of this treatment, but I think it should be carried out along the lines suggested by Dr. Hofheinz, in connection with prophylaxis. We must remember that good gingival surgery has cleared up a lot of cases without the aid of emetin, and I have been unable to decide whether it was gingival surgery that improved these cases, or emetin. We have, however, many reports of cases in which there has been improvement in the patient's comfort. Then we should not forget the fact that after we have cleared the mouth of all forms of endamœbæ, we still have the pathogenic germs. If we clear up the endamœbæ, how about the pathogenic germs? Are they not still there?

In regard to pulp conditions or root-canal work, I would only say that I do not want to be classed as a pessimist, as I was this afternoon. I thought I had a cheerful message to bring to you; I thought I would show that there is repair, and I quoted a number of cases in which something had occurred, but I did not know what it was. I thought I was an optimist instead of a pessimist. I believe in the reparative process, and I am opposed to the destruction of teeth on the simple ground that they are defective. I agree with Dr. Johnson entirely that many well-functioning organs are being destroyed and will be destroyed unless the internist can be taught a lesson which, I am afraid, I for one have not been able to drive home. I would like to know how to instruct him; I would like to be able to differentiate all these areas, but I cannot do it. I cannot interpret radiographs in the same manner as some of my friends who have read osteoblast into radiographs.

Dr. TRUMAN W. BROPHY, Chicago, Ill. During the reading of the essayist's paper and in the discussion which followed, I tried to arrive at some conclusion as to why there are so many views on this subject. Especially with regard to the latter portion of the paper, which dealt with the pathological side of the question, I could not reach any other conclusion than that an immense amount of speculation is rampant concerning the etiology of the condition under consideration, and that there has never been formulated a system which would guide the younger men and enable them to make a diagnosis and treat the disease

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in a scientific manner. In 1903 I read a paper at the meeting of the International Medical Congress in Madrid, Spain, on some of the diseases which medical colleges should teach their students. These diseases were those of the mouth and especially of the teeth, which enable us frequently to trace the cause of diseases elsewhere in the body. If we ask ourselves what we know of the etiology of this condition, which has been given something like twenty-odd names, and which is most commonly known as pyorrhea—to make use of plain terms, pus-flowing—what is pus-flowing? Pus is not a disease, whether it be still or whether it flow; yet in our very defective nomenclature, we speak of the condition which is a sequela of disease, and not in any sense a disease. We must correct our nomenclature in this respect.

What is the reason that we cannot reach a conclusion? There are nearly as many different opinions about this condition as there are men to give opinions, and that suggests to me that there is something wrong. We must conduct experiments in our laboratories, and these experiments must be conducted by men capable of solving these problems. How many years has it been since Dr. Riggs first discussed this inflammation of the dental alveoli, which was then known as Riggs' disease? Far better would it have been to have that name retained than to have it confused with twenty-odd names. We have many diseases known by the names of the men who first described them, like Addison's disease, Bright's disease, etc.—then why not call this disorder Riggs' disease?

By far the most important factor in connection with this matter will be the co-operation of the medical faculties everywhere and their willingness to teach their students dental pathology so far as it relates to the diseases which manifest themselves elsewhere in the body. I regret to say that, as you all know, the average medical student is not capable, not through his own fault, but because he has not had the opportunity to learn how to make a differential diagnosis between any of the simplest diseases that pertain to the teeth and the tissues about the teeth. He does not know the difference between sensitive dentin, pulpitis, incipient dento-alveolar abscess, etc., and now that many medical men are learning that the teeth frequently cause neuralgia, nephritis, gout, arthritis, etc., they have gone back to the opinion held when I entered the profession—namely, that if anything was wrong with the teeth they should be extracted. Now they have gone back to that position, and, as the essayist and Dr. Hofheinz have said, they are not progressing; there has been a wonderful retrograde movement on the part of the men engaged in the treatment of human ills in their advocacy of the destruction of that which they cannot cure. I look upon this condition with deep regret. We are approaching a crisis, and there is, in my opinion, but one course that should be encouraged and followed most faithfully; and that is, to solicit the co-operation of medical teachers and induce them to establish in the schools departments in which the students may obtain knowledge of these conditions which are so important. I was extremely sad a short while ago when a celebrated pathologist declared that the men who were extracting teeth and making dental plates were safer practitioners for the public than those who were endeavoring to preserve them.

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Such opinions, coming from prominent men, are a calamity to the human family. Such doctrines should not be promulgated, but we are helpless as long as medical students are taught nothing about dental pathology.

I think the essayist and the speakers who followed him have given us many valuable suggestions worthy of careful consideration. While we are establishing this great movement for original research work, let us do something to stimulate an interest on the part of teachers and get them to prepare the young men for the work that is before them. I claim that the branch we are dealing with tonight is a part of medical science. Is any one of our medical schools teaching the healing art in all its branches? No. Let it be the aim of the dental profession to take this matter up with the medical faculties, and let some of these bright young men whom I have heard speak here today give a course of lectures in these schools and teach the medical students how to make a differential diagnosis of the many diseases that exist in the oral cavity and to treat them in a scientific manner, so that there will not be many methods of treatment, but one definite plan to be followed with as much accuracy as the modern treatment of appendicitis. Physicians do not have a half-dozen different ideas of appendicitis; they know how to diagnose and treat it, but when it comes to diseases of the mouth, there is a marked difference of opinion. There should not be a difference of opinion on a subject like that; we should have well-defined plans for making a diagnosis, and well-defined courses of treatment. There are divisions and complications, of course, which need special attention, but the general conditions and their treatment should be understood. There should not be *many* ways; there is only one right way, and the rest are wrong; there should be principles laid down upon which practice should be conducted.

Dr. JOHNSON (closing the discussion). I am profoundly grateful to the gentlemen who have taken part in the discussion for the consideration they have shown this evening.

Dr. Hofheinz makes the statement that he was not familiar with the kind of prophylaxis that I mentioned in the paper, and I think the idea may be in the minds of some that I have erected a man of straw and knocked it down. I shall, therefore, again describe the kind of prophylaxis advocated in certain sections, which consists in grinding away all the anatomical markings of a tooth, whether it be decayed or not. For instance, the sulcus in the occlusal surface of a molar is ground out, and the surface made smooth by some prophylactists. We have on the lingual surfaces of the upper incisors a little projection of enamel placed there by nature; that is ground off, and the surface of the tooth made smooth, no matter how far the grindstone has to go. At the gingival region of every tooth they use a strip of sandpaper and saw back and forth. No matter if the enamel is thin at that point, the surface is made smooth and polished, and every tooth in the arch is treated that way. Such methods I am decidedly opposed to, and would call them criminal malpractice. These methods are being practiced in some sections of the country, and patients are frequently made uncomfortable thereby. I admit that such a procedure will bring about improvement in the tissues surrounding

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the teeth in many mouths, and that the improvement may be apparent for some time, but I am looking to the future, and I will never countenance any dental treatment in my patients that I would not advocate in my own family.

Dr. Hofheinz has asked me to go into a discussion of the treatment of tortuous root-canals, but I feel that we have had enough of the treatment of pulpless teeth at this meeting, and as I went into that subject somewhat carefully in my paper last year, I shall, with your permission, dismiss this topic for the present.

I wish to say a word about Dr. Grieves' discussion. I have been greatly pleased with his statement in relation to medical men, in which he intimated that they have issued to us a challenge that we help them in eliminating certain diseases, and he was modest enough to say that he was not able to meet that challenge in all respects. Dr. Grieves has done more to add to our knowledge in this respect in the past few years than almost any man I know. He has gone into the subject in a scientific way, and I will not acknowledge, as he has done in his modesty, that he is unprepared to meet this situation. He is prepared to meet medical men on an equal basis and throw light upon these afflictions that are affecting the human family; he is able to meet the medical profession and consult with them intelligently on these questions; and that is what every dental practitioner should equip himself to do. We shall never redeem ourselves in the eyes of the medical profession or the world at large until we follow Dr. Grieves' suggestions regarding the relationship between apical infections, for instance, and systemic troubles.

We are going right ahead in research work, and I feel, as one gentleman said in regard to Dr. Gies' paper, that we should support dental research work. I heard a medical practitioner say, when he learned that dentists had raised a fund of forty-five thousand dollars for research work, that it was the most magnificent news he had ever heard, and he did not believe it was possible to raise a similar amount of money in any body of medical men to prosecute a similar research.

Yet it is not so much the work that is being done by these committees that is going to do the greatest good for the greatest number; the greatest good is to come from the individual member of the profession who goes into his study and devotes time to the consideration of the problems that he meets in his practice. The statement was made by the president of the Illinois State Dental Society that the professional man's career was made or marred in the hours after dinner. What you do in your studies at night, is going to hasten the uplift of the profession. It is these combined efforts of the research committees and of the individual dentist who is a close observer and is able to apply the subjects studied in his laboratory to his practice at the chair that are going to elevate the profession. Our profession has been charged with a lack of scientific interest, and now most decidedly we must prove that we are students, and then, when the time comes, we will be able to meet the challenge of the medical man and be able to consult with him on common ground.

I wish again to express my deep gratitude for the reception you have given me at this meeting.

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FORSYTH TESTIMONIAL.

[To represent the Society at the Panama-Pacific Dental Congress and the National House of Delegates, at San Francisco, California, 1915.]

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E. A. SMITH, Rome, 1917.	F. C. WALKER, Brooklyn, 1917.
E. HILLYER, Brooklyn, 1917.	W. C. DEANE, New York, 1917.

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[THE membership of the State Society, in accordance with the By-laws adopted May 1913, is composed of all the active members of the nine District Societies.]

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Dr. E. T. Darby, Philadelphia, Pa.
Dr. Wm. Jarvie, Brooklyn, N. Y.
*Dr. W. D. Miller, Berlin, Germany.
Dr. Eugene S. Talbot, Chicago, Ill.
Dr. M. H. Cryer, Philadelphia, Pa.
Dr. N. S. Jenkins, Dresden, Germany.
Dr. R. R. Andrews, Cambridge, Mass.
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*Dr. James Truman, Philadelphia, Pa.
Dr. William Carr, New York City.
Dr. Chas. N. Johnson, Chicago, Ill.

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Crane, J. W., Paris, France.
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Merritt, Chas., New York.
Nash, S. M., New York.
Seabury, F. N., Providence, R. I.
*Shepard, L. D., Boston, Mass.
Stowell, S. S., Pittsfield, Mass.

* Deceased.

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Presidents of the New York State Dental Society.

Annual Session.	Name.	Residence.	Date of Election.
Organization	Amos Westcott	Syracuse	June 30, 1868
1st	B. T. Whitney	Buffalo	July 28, 1869
2d	L. W. Rogers	Utica	June 30, 1870
3d	W. B. Hurd	Brooklyn	June 29, 1871
4th	C. A. Marvin	Brooklyn	June 27, 1872
5th	J. G. Ambler	New York	June 26, 1873
6th	W. C. Barrett	Warsaw	June 25, 1874
7th	W. C. Barrett	Warsaw	July 1, 1875
8th	C. A. Marvin	Brooklyn	July 13, 1876
9th	L. F. Harvey	Buffalo	May 10, 1877
10th	A. M. Holmes	Morrisville	May 9, 1878
11th	C. E. Francis	New York	May 14, 1879
12th	O. E. Hill	Brooklyn	May 13, 1880
13th	O. E. Hill	Brooklyn	May 12, 1881
14th	L. S. Straw	Newburgh	May 9, 1882
15th	L. S. Straw	Newburgh	May 10, 1883
16th	L. S. Straw	Newburgh	May 14, 1884
17th	F. B. Darby	Elmira	May 15, 1885
18th	N. W. Kingsley	New York	May 13, 1886
19th	N. W. Kingsley	New York	May 11, 1887
20th	J. E. Line	Rochester	May 9, 1888
21st	E. D. Downs	Owego	May 7, 1889
22d	W. W. Walker	New York	May 14, 1890
23d	W. W. Walker	New York	May 13, 1891
24th	W. W. Walker	New York	May 12, 1892
25th	F. L. Van Woert	Brooklyn	May 10, 1893
26th	F. L. Van Woert	Brooklyn	May 10, 1894
27th	H. J. Burkhart	Batavia	May 9, 1895
28th	H. J. Burkhart	Batavia	May 14, 1896
29th	H. J. Burkhart	Batavia	May 13, 1897
30th	F. Le Grand Ames	Albany	May 12, 1898
31st	F. Le Grand Ames	Albany	May 11, 1899
32d	J. I. Hart	New York	May 9, 1900
33d	J. I. Hart	New York	May 10, 1901
34th	R. H. Hofheinz	Rochester	May 15, 1902
35th	R. H. Hofheinz	Rochester	May 14, 1903
36th	W. Jarvie	Brooklyn	May 13, 1904
37th	W. J. Turner	Brooklyn	May 12, 1905
38th	W. A. White	Phelps	May 11, 1906
39th	W. S. Rose	Schenectady	May 10, 1907
40th	L. Meisburger	Buffalo	May 8, 1908
41st	B. C. Nash	New York	May 9, 1909
42d	A. R. Cooke	Syracuse	May 10, 1910
43d	Ellison Hillyer	Brooklyn	May 5, 1911
44th	Charles F. Bayliss	Oneonta	May 10, 1912
45th	Wm. W. Smith	Rochester	May 9, 1913
46th	Albert M. Wright	Troy	May 14, 1914
47th	Stephen Palmer	Poughkeepsie	May 13, 1915

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CONTENTS.

	PAGE
Address of the President	55
Committees, list of	244
Dental Examiners	244
Essays and Discussions—	
"Concerning the Problem of Dental Caries." By ARTHUR HOPEWELL-SMITH, L.D.S., L.R.C.P., M.R.C.S.	94
"Some Advantages of Jacket Crowns." By WM. A. CAPON, D.D.S.	110
"The Relation of the Vitality of the Periapical Cementum and Adjacent Tissues to the Patient's Health and the Status of the Dental Profession." By CLARENCE J. GRIEVES, D.D.S.	126
"Studies of Internal Secretions in Their Relation to the Development and Condition of the Teeth." By WM. J. GIES, Ph.D., Sc.D., and Collaborators	161
"Studies of the Influence of Unbalanced Diets on Dentition." By WM. J. GIES, Ph.D., Sc.D., and Collaborators (I) 189, (II)	192
"A Consideration of Some of the Present Tendencies in Dentistry." By C. N. JOHNSON, M.A., L.D.S., D.D.S.	229
Executive Council, membership of	244
Fellows	247
Members, honorary	247
Officers, election of	13
" etc., for 1915–16	244
Presentation of Fellowship medal	7
Report—Committee on Amendments to By-laws	32
" Committee on Arrangements	20
" Committee on By-laws	21
" Committee on Clinics	21
" Committee on Dental Index Bureau	34
Report—Committee on Dental Service in State Institutions	25
" Committee on Ethics	22
" Committee on Exhibits	31
" Committee on Fellowship	7
" Committee on Law	15
" Committee on Legislation	22
" Committee on Liability Insurance	33
" Committee on Necrology	25
" Committee on Oral Hygiene	26
" Committee on Practice	81
" Committee on President's Address	5
" Committee on Registration	31
" Committee on Scientific Research 159; Finance	23
" Committee on State Library	24
" Committee on Trained Nurses	22
" Correspondent	62
" Executive Council	10
" Secretary	13
" Treasurer	14
Reports from District Societies—	
First District	35
Second District	40
Third District	43
Fourth District	44
Fifth District	46
Sixth District	47
Seventh District	49
Eighth District	51
Ninth District	53
Sessions—First Day, Afternoon	3
" " Evening	5
Second Day, Afternoon	6
" " Evening	7
Third Day, Morning	9

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TRANSACTIONS

OF THE

DENTAL SOCIETY

OF THE

STATE OF NEW YORK

FORTY-EIGHTH ANNUAL MEETING

HELD AT

ALBANY, N. Y., MAY 1916

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TRANSACTIONS

OF THE

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OF THE

STATE OF NEW YORK

FORTY-EIGHTH ANNUAL MEETING

HELD AT

ALBANY, N. Y., MAY 1916

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TRANSACTIONS

OF THE

Dental Society of the State of New York.

FORTY-EIGHTH ANNUAL MEETING.

FIRST DAY—Morning Session.

THE forty-eighth annual meeting of the Dental Society of the State of New York was opened on Thursday morning, May 11, 1916, in the assembly room of the Education Building, Albany, N. Y.

The president, Dr. Stephen Palmer, Poughkeepsie, called the meeting to order at 10 A.M.

The Rev. WM. HERMAN HOPKINS, First Presbyterian Church, Albany, invoked divine blessings on the deliberations of the society.

Address of Welcome.

BY THE GOVERNOR OF NEW YORK STATE.

Dr. Palmer introduced to the society Hon. C. S. WHITMAN, governor of New York State, who delivered the welcoming address to the society, as follows:

Mr. President, ladies and gentlemen,—It is always a great privilege and pleasure as well as one of the pleasantest experiences—and there are many which the Governor of New York is permitted to have—to welcome to the capital city citizens from all over this great dominion which we call New York. The building in which you are convening is just as much your building as it is the property of the department of Education or of the administration or of the Governor of New York. It is your right as citizens to convene here, and I believe that it is always well, it is always advisable, in so far as it is convenient and proper, for our citizens to hold meetings of this kind here; it is well for them to meet in this capital city and familiarize themselves with the conditions here as far as they can, and to become accustomed to this building, to become acquainted with the departments, and to recognize the splendid facilities which our state has provided and which belong to us as an administration, not as a political organization or party, not as men like to possess objective possessions, but to you, to all our citizens, this magnificent building and all that it stands for, all that it symbolizes in the education and life

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of the girls and boys, the young men and women of the state, the whole educational life of the state—it belongs to you. Not because you are taxpayers; some of us are, I presume—I do not know but what all dentists are taxpayers; I sometimes think they ought to be, from my experience with them—but whether we are taxpayers or not, it belongs to us as citizens of this great state and all with a common interest. We know you will receive, and I am sure that you can depend upon receiving, the hospitality, the good will, and the good wishes of the citizens of Albany. We know that for many years visitors who have come here attending various conventions and conferences of various kinds have received a hearty welcome from the citizens of Albany, who welcome those who come not as strangers but as fellow citizens, interested as they are in all that concerns the welfare of the state.

I congratulate this body on its evident appearance of success and prosperity, although it means suffering to so many. I have had many experiences with dentists, and while I do realize that there are no men living who contribute more to our comfort and perhaps to our life, I cannot forget the suffering which I have undergone in your chairs, and at the hands of some of you! I congratulate you on the achievements of your profession. I am informed by those who are experts in general surgery in this country, not in your own particular specialty, that probably the best dental work done in the world is done in America, and I congratulate you on the degree of success and advancement you have made in your specialty. It means of course a great deal to our citizens, it means a great deal to public life in the way of individual comfort and the building-up of the physical and—yes, mental strength of the public.

So, gentlemen, I wish you every success, and I am sure that I express the hope of all our good citizens when I wish that this meeting may be productive of much good as you convene together in conference to discuss and debate the questions which concern you in your profession. But as it concerns you in your profession, it concerns the health of all our people, and I trust that out of such discussions and such debates may come improvement and advancement in the profession of dentistry, which of course indirectly must mean improvement and advancement in the health and strength of our people.

I congratulate you and welcome you, and if you have time, I assure you that you will receive a most hospitable welcome in the executive chamber during any of the hours you are in the city and have the opportunity to call there. The governor is very likely to be there almost constantly during the next forty-eight hours.

On behalf of the administration, on behalf of the citizens of the city and of the state, I repeat, I most cordially welcome you to the capital city of our state. [Applause.]

Dr. Murray, vice-president, occupied the chair while the president, Dr. STEPHEN PALMER, Poughkeepsie, read his annual address. [See pages 63 to 67.]

Dr. Murray appointed as the committee to consider the President's address and report to the society at a later session Dr. A. W. Twiggar, Ossining, Dr. R. H. Whitmyre, Schenectady, and Dr. E. G. Parker, Goshen. [See page 24.]

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The President then resumed the chair, and introduced as the first essayist on the program Dr. C. C. VOELKER, Brooklyn, who read a paper entitled "Dental Silicate Cements in Theory and Practice." [See pages 105 to 126.]

The meeting then adjourned until the afternoon session.

FIRST DAY—Afternoon Session.

The meeting was called to order on Thursday afternoon, at 4 o'clock, by the president, Dr. Palmer.

Dr. Palmer introduced to the society Dr. THOMAS P. HINMAN, of Atlanta, Ga., president of the National Dental Association, who addressed the audience on the subject of the coming National meeting, which he invited all the members of the State Society to attend, and also outlined the present condition of the National, and recommended that the society approve of the intention on the part of the National to raise the dues at the coming meeting for the future work to be done by the association.

Dr. Palmer next introduced Dr. L. M. WAUGH, New York, Correspondent of the society, who presented a paper on the subject of "Normal Occlusion: Its Influence Upon the Integrity of the Supporting Structures of the Teeth," as the Report of the Correspondent. [See pages 68 to 84.]

The next item on the program was an illustrated talk by Dr. H. R. RAPER, Indianapolis, Ind., on "The Influence of the Radiograph on the Practice of Dentistry."

The society then adjourned until the evening session.

FIRST DAY—Evening Session.

The meeting was called to order Thursday evening, May 11th, at 8 o'clock, by the president, Dr. Stephen Palmer.

The first item on the program for the evening session, as announced by the President, was the reading of a paper by Dr. ABRAM HOFFMAN, Buffalo, N. Y., entitled "The Practical Measurements Involved in the Construction of Complete Dentures." [See pages 127 to 139.]

The next order of the program was the reading of the "Report of the Committee on Practice," by Dr. DANIEL H. SQUIRE, Buffalo. [See pages 85 to 100.]

The society then adjourned until the Friday morning session.

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SECOND DAY—Morning Session.

The meeting was called to order by the president, Dr. Palmer, at 9.30 o'clock, Friday morning, May 12th.

The President introduced as the first speaker JOSEPH C. BLOODGOOD, M.D., Baltimore, Md., who gave a lecture entitled "The Recognition of Precancerous and Early Malignant Lesions of the Oral Cavity."

The next item on the program was the reading of a paper by Dr. THOMAS P. HINMAN, Atlanta, Ga., entitled "Diagnosis and Treatment of Vincent's Angina: Report of a Case Involving the Lungs." [See pages 140 to 147.]

The meeting then adjourned until Friday afternoon at 2 P.M.

SECOND DAY—Afternoon Session.

The meeting was called to order Friday afternoon at 2 o'clock, by the president, Dr. Palmer.

The first item on the program for the afternoon session was the report of the Committee on Scientific Research, by Dr. W. B. DUNNING, chairman of the committee. [See pages 101 to 104.]

Dr. Dunning then introduced Dr. WILLIAM J. GIES, New York, who presented a report on "Studies of the Influence of Diet and of Internal Secretions on Dentition."

Dr. Palmer introduced as the next speaker of the afternoon Dr. THOMAS L. GILMER, Chicago, Ill., who read a paper entitled "A Clinical and Experimental Study of Chronic Alveolar Abscess in Relation to Systemic Disorders." [See pages 148 to 165.]

The society then adjourned until 8 P.M.

SECOND DAY—Evening Session.

The meeting was called to order after the banquet, on Friday evening, May 12th, at 9 o'clock, by the president, Dr. Palmer.

Dr. Palmer introduced Dr. THOMAS P. HINMAN, Atlanta, Ga., president of the National Dental Association, who addressed the society with regard to the coming meeting of the National Association to be held in Louisville, Ky.

The President next introduced Hon. J. A. LAWSON, of Albany, who spoke on the subject of "Filling a Cavity."

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Report of the Fellowship Committee.

The next order of business was the report of the Fellowship Committee, by Dr. A. R. COOKE, chairman, as follows:

For several years the State Society has awarded a gold medal to men who have proved themselves particularly worthy and have performed distinguished services for the profession. It is particularly pleasing to the committee tonight to announce the award of the medal this year, as the committee feels that you will all agree with us in signifying our choice. For many years the members of this society have honored, loved, and respected the man to whom we wish to make the award, and I take great pleasure in announcing as the unanimous choice of the committee, Dr. Victor Hugo Jackson, of New York City. (Applause.)

The president, Dr. PALMER, in presenting the Fellowship Medal to Dr. V. H. Jackson, New York, spoke as follows:

The heights by great men reached and kept
Were not attained by sudden flight;
But they, while their companions slept,
Were toiling upward in the night.

This quotation it seems to me applies perfectly to you, Dr. Jackson, as no man could reach the heights you have without toiling day and night. A similar thought must have been in the minds of the Fellowship Committee when they selected you as the recipient of this medal, which represents the highest honor that this society can bestow upon its members. Selections have been made from year to year from the members of the profession, all chosen because of their loyalty and faithfulness to our chosen profession, but it has devolved upon me to honor one of our own members.

You have been selected from among your associates because it is known that you have spent the best part of your life in working for the advancement of dentistry. You, a miller's son, have proved the value of a continual guide; you undoubtedly received the inspiration from watching the grinding in the mill of your ancestors. You started out with a set purpose, and you have accomplished that purpose, and every practicing dentist in every part of the world looks upon you and your work as one of the pillars which will ever support the upward growth of dentistry.

As an example of your generous attitude of mind toward your fellow men, I take these words from the preface of your book: "I freely give the results of my study to the profession. I reserve no rights in the system to which I have devoted my years of thought and labor. Although no patent protects me, I am not without great reward, found in the knowledge that I have in a manner aided the work to which we give the best of our lives. If my professional brothers find my system as outlined a help, and a step along the road of progress, I am amply repaid."

You have been honored by being made a member of many societies in all parts of the world, and tonight we honor you.

Dr. Victor Hugo Jackson, it gives me great pleasure to present to you tonight, in the name of the Dental Society of the State of New York, the William Jarvie Fellowship Medal. Accept it, cherish it; it is given to you because we as a society appreciate your untiring efforts in our behalf.

Dr. JACKSON, in accepting the medal, said:

Mr. President and fellow members of the Dental Society of the State of New York,—The honor which you have conferred upon me this evening in making me a Fellow of this society and, in pre-

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senting me with this treasure, the Jarvie Fellowship Medal, is deeply appreciated, and I thank you.

The complimentary remarks of our president impress me with the feeling that this honor is not so much the recognition of an individual as it is of certain work which has been done for the benefit of the public and for dentistry, and, in voicing my appreciation, I cannot do better than to allude to some of the ideals which have inspired this work, and which must be the inspiration of us all in the future if we live up to the great opportunities afforded us.

In our profession we are beginning to have charge of the health of the individual very early in life. We deal with those portions of the air and food tracts which are of first and sometimes greatest importance to the proper development of the individual.

The members of the medical and the dental professions should be in full accord, and work harmoniously together for the general good of the public. The "laws of diet and of nutrition" should be thoroughly understood by every one of us, if we wish to attain the best possible results. The dieting of the patient is becoming a dominant factor in the treatment of many physical conditions. In practice among growing children, it is often found that the condition of the health and teeth indicates a lack of bone nutrition, which proves that the proper food elements have not been supplied, and by clinical experience it has been shown that the needed nourishment can generally be furnished medicinally.

At the age of three years the child should be taken to the dentist, and from that time on, at frequent intervals. The general practitioner should learn to recognize normal and abnormal arches, and to understand the influences of the abnormal arch on health and bodily development. He should know what proper mastication of food is, how it is performed, and when the teeth are in the correct position to perform it; also what normal breathing is, the part it plays in developing the body, and the protection it affords against many of the air-borne diseases. Parents should be informed of the needs of their children, the consequences of neglect, and be directed to the one best fitted to help.

At this time there is a great opportunity open to us along the line of constructive or prophylactic treatment in the use of medicines which enable the body to appropriate and assimilate what is needed for growth and for protection against disease.

When our work is viewed from the proper perspective, it will be seen to be truly medical, even more so than the work of one who can only prescribe for the body that is already ill.

We are enabled to diagnose faulty development of the dental arches with malpositions of the teeth, and the consequent effect upon the function of mastication in preparing the food for assimilation by the body. We are able not only to diagnose but to remedy such conditions, and at the same time remedy some of the more serious malformations of the nasal passages, so that the child is enabled to breathe properly.

Your attention is called to these thoughts to bring before you the importance of the further development of a specialty. A lifetime spent in the study of orthodontia enables one to fully appreciate the scientific and mechanical difficulties to be overcome in this special line of work.

Our profession has accomplished

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much, but there are still greater opportunities for service open to every practitioner who will avail himself of them. There are young men who will begin where we leave off, and who will go farther than we have gone.

May the day speedily come when the dentist will be recognized as one of the most valued of public servants, and when the title D.D.S., as well as the title of M.D., will mean not only a consecration to useful service but a badge of honor that will open all doors to every worthy wearer.

From a personal viewpoint, the orthodontist is the one best prepared to improve the natural means for better supplying nourishment to the body. Water, air, food, light, and heat, known as "vital stimuli," form the natural support of man.

The orthodontist is dealing with a most important science, namely, the restoring of nature to her own by the changing of malocclusion of the teeth to normal occlusion, enabling the patient to better prepare the food for assimilation, thereby improving the general bodily nutrition—a vital stimulus. Furthermore, as the roof of the mouth forms the floor of the nose, the expansion of the dental arch, by providing more nasal space, gives a better supply of air—a vital stimulus. The responsibility of obtaining the necessary bodily nutrition and increasing the nasal space for the normal supply of air rests with the orthodontist.

If we expect to achieve great things in our chosen calling and to render to mankind our best service, we must have high ideals in our professional life.

The recognition you have given my work is fully appreciated. It gives me joy to think that it has helped, if only a little, to hasten the day of bigger and broader service to humanity.

Again I thank you.

Dr. Palmer next introduced Dr. W. A. Howe, of the Education department of New York State, who spoke to the society with reference to the educational work being carried on in the state by the Education department and the Board of Health.

The next order of business was the report of the Executive Council, by the secretary, Dr. G. B. Beach. [See pp. 11–14.]

Dr. Beach moved that the report of the Council be adopted.

Dr. Ottolengui amended the motion to the effect that the report be accepted with the exception of that part which recommends that the National Dental Association do not increase its dues.

Dr. Meisburger raised the point that according to the by-laws the report of the Council was not debatable, and had to be accepted or rejected by the society.

Dr. Ottolengui. As my amendment did not receive a second, I would move that the rules be suspended and that we be permitted to discuss the question.

Dr. Rich raised the objection that this was not the occasion for discussing this question; that it should go before the Council, and that the Council was willing to hear Dr. Ottolengui at any session.

Dr. Ottolengui said it was impossible to attend all the meetings of the Council and still get the benefit of the scientific sessions of the society, and thought that the members should have some privilege in discussing the report of the Council, or rather their action.

Dr. Hillyer asked if there was any objection to the Council convening at

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this time, and if there was not, he would like some member of the Council to present such a motion.

Dr. RICH moved that, inasmuch as this was a matter which required action by the Council, the Council go into committee of the whole. (Motion carried.)

Dr. Rich, chairman of the Council, took the chair.

The question of raising the dues to the National Dental Association was then discussed by Drs. Ottolengui, Jarvie, McCall, Murray, Hert, Hillyer, Roberts, and Dr. Hinman, president of the National Dental Association.

Dr. HERT moved reconsideration of the motion by the Council with regard to raising the dues. (Motion carried.)

Dr. RICH declared the Council adjourned.

Dr. PALMER moved that the original meeting reassemble, and that the society accept the report of the Executive Council. (Motion carried.)

Dr. Palmer took the chair, and announced as the next order of business the installation of officers for the ensuing year, after which motion was made and carried to adjourn.

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MINUTES OF EXECUTIVE COUNCIL.

Special Meeting.

SYRACUSE, January 29, 1916.

A SPECIAL meeting of the Executive Council of the New York State Dental Society was held January 29, 1916, at Syracuse, N. Y.

The members present were Drs. Rich, West, Murray, Gould, Hert, Randall, Wheeler, and Beach. *Ex-officio members*—A. P. Burkhart and Stephen Palmer; also Dr. H. J. Burkhart, of the Special Legislative Committee.

The Special Legislative Committee reported a proposed dental law, the general provisions of which were read by Dr. A. C. Rich, chairman of the committee. After extended discussion a ballot was taken, the members voting as follows: Murray, Rich, Hert, Randall, Wheeler, West, A. P. Burkhart, and Stephen Palmer—"Yes." Gould and Beach—"No."

The report was declared carried and the bill was referred to the Legislative Committee, with the chairman of the Council, to introduce into the legislature.

The Legislative Committee was instructed to communicate with every member of the State Society, asking individual support for the bill.

A resolution was introduced by Dr. Gould as follows: RESOLVED, That the Secretary be directed to renew with the S. S. White Dental Mfg. Co. a contract like the one in force in 1915, for reporting, publishing, and distributing the annual Proceedings of 1916 of the Dental Society of the State of New York. The resolution was carried.

A motion that Dr. Gies' paper of May 1915 be published in abbreviated form in the *Allied Dental Journal* was carried.

A motion was carried that the fiftieth anniversary meeting of the New York State Dental Society be held in New York City in 1918.

Meeting adjourned.

G. B. BEACH, *Sec'y.*

Regular Meeting, at Albany.

ALBANY, May 10, 1916.

The minutes of the special meeting of the Executive Council of the New York State Dental Society, held in Syracuse on January 29, 1916, were read and approved.

The Report of the President was read by Dr. A. P. Burkhart.

A motion was carried that the secretary of the society write a letter to the Empire Trust Co., of New York City, to be signed by the secretary and president of the society, stating that the chairman of the Committee on Scientific Research of this Society has authority to disburse its own funds.

The Report of the Secretary was read and received.

The Report of the Treasurer was read by Dr. G. B. Beach, and shows a balance from last year of $2,855.84, and a balance on hand in the Society Fund of $3,185.92. The report was received and sent to the Auditing Committee.

A motion was carried that the chairman of the Council appoint a Budget Committee, whose duties will be to propose limits for expenses of the various committees. Dr. Hert and Dr. Wheeler were appointed.

The report of the Committee on Ethics, by Dr. J. N. Garlinghouse, was read and received.

The report of the Committee on Practice, Dr. Daniel H. Squire, chairman, was read and referred to the society for its consideration.

The report of the Committee on Trained Dental Nurses was read and received and the committee discharged.

The report of the Committee on Special Legislation was read and received and the committee discharged.

The report of the Committee on Liability Insurance and Employment of Attorney was

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read and received, and the committee discharged.

Dr. Heatwole of Baltimore, Md., addressed the Council in connection with the report of the Committee on Liability Insurance and Employment of Attorney.

A motion was carried that the chairman of the Executive Council appoint a committee as Trustee, who shall have in charge the matter of liability insurance, and that the Executive Council recommend the United States Fidelity & Guaranty Co. as the company in which to insure under a blanket policy. Dr. J. W. Canaday was appointed as such trustee.

A motion was carried that Dr. Heatwole be given an opportunity to present the matter of liability insurance to the main session.

A motion was carried that the following changes in the By-laws be adopted:

Change Section 39 of the By-laws on page 31, where it now reads "Each district society shall annually pay into the treasury of the State Society the sum of $2 for each member on or before the 25th day of April of each year," to read "$4," and such other changes as are necessary to make the various articles in the By-laws conform to Section 39; this amendment to take effect on and after May 13, 1916.

Amend subdivision 3 of Section 15 by striking out the words "in the afternoon" and "three o'clock."

Amend Section 32 of the By-laws to read as follows: "The society shall hold its annual meeting, commencing on the second Thursday of May in each year, at 10 A. M., and such other special meetings as may be necessary. At each annual meeting before adjournment the Executive Council shall name the next place of meeting."

The report of the Committee on Legislation was read and received.

The report of the Committee on Oral Hygiene, Dr. Lincoln A. Timerman, chairman, was read and approved.

Dr. Lincoln A. Timerman, chairman of the Oral Hygiene Committee, addressed the Council in connection with his report, and a motion was carried that the Executive Council receive a refund of $200 from the Oral Hygiene Committee.

The report of the Committee on Clinics was read and received.

A motion was carried that the arrangement entered into by the chairman of the Clinic Committee with Dr. Stanton, for the purpose of demonstration, be ratified by the Council.

The report of the Committee on State Dental Service in Public Institutions, by Dr. Twiggar, was read and received, and the committee continued.

The report of the Committee on Fellowship, Dr. A. R. Cooke, chairman, was read and received. Dr. Victor Hugo Jackson receiving the Fellowship Medal this year.

The report of the Forsyth Testimonial Committee, Dr. Ellison Hillyer, chairman, was read and received.

A motion was carried that in consideration of the present financial condition of the society the contract for publishing the Proceedings with the S. S. White Dental Mfg. Co. be renewed for the year 1917, which contract shall carry with it the publishing of Dr. Gies' complete report on Scientific Research.

A motion was carried that the secretary be authorized to have printed 2000 copies of the By-laws as amended to date, together with the new dental law and such other matter as is contained in the present publication, and that Dr. A. P. Burkhart be appointed a committee to compile the same.

A motion was carried that the New York State Dental Society, through its secretary, be authorized to extend a most urgent invitation to the National Dental Association to hold its 1917 meeting in New York City.

A recommendation was made that in the next communication from the secretary to the members of the State Society, members be requested to contribute to the society any numbers of our printed Transactions needed to complete the file of the association from the time of the organization to date.

A motion was carried that Dr. Hert and Dr. Murray be appointed a committee with power to procure for the State Society a complete set of the proceedings of the society.

A motion was carried that the treasurer pay the dues to the National Dental Association at the time when the membership cards are sent.

The report of the New York State Finance Committee of the Scientific Research and

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Foundation Fund of the National Dental Association was read by Dr. Henry W. Gillett.

The report of the Law Committee, by Dr. William Carr, chairman, was read and received.

A motion was carried that the Executive Council recommend to the Board of Regents that all unfinished litigation of the Law department of the State Society remaining on September 1, 1916, should be continued to completion by the present attorney of the Law Committee.

A motion was carried that the report of the State Audit Co., presented by Dr. Carr with his report, be printed, in connection with his report, in the proceedings of the State Society.

A motion was carried that, after consultation with all the members of the Executive Council, the president appoint a suitable committee to arrange for the time, place, and expenses of a testimonial to be tendered to Dr. William Carr for thirty-three years' service as chairman of the Law Committee, and to the attorney for the Law Committee of the State Society. Mr. William A. Purrington, to occur at some time in the autumn in New York City.

The report of the Committee on Arrangements, Dr. Morton Van Loan, chairman, was read and received, and the financial portion referred to the Auditing Committee.

A motion was carried that provision for the storage of chairs in the Education building be made, and be placed in the hands of the Committee on Arrangements.

Mr. Young, a representative of the New York Merchants' Association, addressed the Council relative to the facilities and advantages to be offered by the New York Merchants' Association for the 1918 meeting in New York City, touching particularly upon hotel space for general, sectional, and committee meetings, etc., information bureau, publicity, entertainment, etc.

The report of the Committee on the President's Address, Dr. Albert W. Twiggar, chairman, was read.

A motion was carried that a special committee, consisting of Dr. Hert and Dr. H. J. Burkhart, take the recommendation of the Eastman testimonial into consideration, and that they be given power to take any action in their judgment necessary to complete the testimonial, and report to this society at the session of 1917.

The Report of the Committee on Necrology, Dr. C. C. Bachman, chairman, was read and received, and referred to the Business Committee to be read.

The Report of the Committee on Scientific Research, Dr. William B. Dunning, chairman, was read and received, the committee being given $500 for its use in scientific work for the ensuing year.

A motion was carried that a vote of thanks be extended to Professor Gies and his collaborators.

A motion was carried that the Research Committee be empowered to publish an epitome of next year's report of Professor Gies' investigations, at an expense of not to exceed $25, to be ready for distribution at the next annual meeting.

A motion was carried that the usual honorariums be paid to the secretary and treasurer, viz, $200 to the secretary and $100 to the treasurer.

The report of the Program Committee, Dr. L. H. Gilbert, chairman, was read and received and ordered sent to the Auditing Committee.

The report of the State Library Committee was read and received.

Dr. T. P. Hinman, president of the National Dental Association, addressed the Council in the interests of the Research Institute of the National Dental Association, and a vote of thanks was extended to Dr. Hinman for his address on this subject.

Dr. H. L. Wheeler introduced the following resolution: "The Council regrets that a raise of $2 per year in our annual dues makes it seem inadvisable to increase our dues at the present time. We do, however, approve of the Research cause, and recommend that our members be urged to support it with increased liberality, and suggest that the campaign for funds be carried on in our district societies with increased vigor." This resolution was adopted.

Dr. J. Wright Beach presented a resolution that the Dental Society of the State of New York indorse the objects of the Preparedness League of American Dentists, and recommend

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the support of its principles, which was adopted.

Dr. John McCall addressed the Council on behalf of the Dental Index Bureau, regarding the work of that bureau.

A motion was carried that the Council recommend to the New York State Dental Society that the members contribute to the best of their ability to the Dentists' Relief Fund.

Dr. William A. Howe was unanimously elected an honorary member of the New York State Dental Society.

A motion was carried that the Finance Committee of the New York State Scientific Research and Foundation Fund of the National Dental Association be continued.

The report of the Auditing Committee, Dr. C. A. Bradshaw, chairman, was read and received.

A resolution was offered by Dr. Wheeler that figures showing the amount of money expended for carrying on this meeting be published in the proceedings.

The report of the Exhibit Committee, Dr. L. S. Blatner, chairman, was read and received. The report shows the amount to be turned in to the Society Fund to be $541.14.

A motion was carried that the New York State Dental Society hold its next annual meeting in Buffalo, commencing on the second Thursday in May 1917.

Election of Officers.

The following officers of the New York State Dental Society for the ensuing year were elected:

President—Robert Murray, Buffalo.
Vice-president—A. C. Rich, Saratoga.
Secretary—A. P. Burkhart, Auburn.
Treasurer—G. H. Butler, Syracuse.
Correspondent—Dr. L. M. Waugh, New York City.

The following were elected members of the Executive Council for the ensuing year:

Sixth District—C. M. Dunne, *regular;* H. D. Whitmarsh, *alternate.*

Seventh District—B. S. Hert, *regular;* C. L. Brininstool, *alternate.*

A motion was carried that we recommend the following to the Board of Regents for the appointment of Dental Examiners:

Second District—F. C. Walker, Brooklyn; A. H. Stevenson, Brooklyn.

Fifth District—A. R. Cooke, Syracuse; Sheridan Slocum, Oswego.

Ninth District—H. C. Bennett, Newburgh; D. W. McLean, Mt. Vernon.

The recommendations from the district societies for the election of their committees for the ensuing year were approved. [See District Society Reports, pages 41 to 62; also Officers and Committees for 1916–1917, pages 166 to 168.]

The following were elected delegates to the House of Delegates of the National Dental Association:

Fourth District—A. C. Rich, L. A. Timerman.

Sixth District—J. B. West, C. F. Baylis.

Eighth District—Louis Meisburger, D. H. Squire.

Ninth District—Stephen Palmer, A. W. Twiggar.

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REPORTS OF OFFICERS AND COMMITTEES.

Report of the Secretary.

ALBANY, May 10, 1916.

TO THE COUNCIL:

Gentlemen,—In accordance with the action of the Executive Council at Syracuse on January 29, 1916, the secretary entered into contract with the S. S. White Dental Mfg. Co. for the publication and distribution of the Transactions of the present session of 1916.

Dr. L. P. Anthony will be present as usual and report the various sessions.

The secretary recommends that the incoming secretary be directed to contract with the S. S. White Co. for the sessions of 1917, on the same basis as that of 1916.

The preliminary notice was mailed about April 1st, and it contained a little more than the usual information found in early notices. Among the items of information I call your attention to the amendments adopted at the last annual session, and the amendments which will come up at the present session. One very important amendment which will receive the consideration of the Executive Council will be the adoption or rejection of the amendment intended to increase the dues of the district members to be paid to the State Society. Possibly the society's indebtedness to Dr. Wm. Carr and the celebration of the fiftieth anniversary of the State Society in 1918 may have a bearing in determining the amendment. In a communication from Dr. Carr, dated April 1st, he states, "Under no circumstances will I again take the chairmanship of the Law Committee, and I shall want a public accountant to go over the reports of each year, fearing that errors of which I am not cognizant may have crept in; and as I am going to leave the office, I want the accounts absolutely correct."

Relative to the probable expense of featuring our fiftieth anniversary in New York City, it occurred to me that reliable information could be best obtained from sister state societies, and for that purpose I have selected the Illinois State Society, which celebrated its fiftieth anniversary in March 1914. With a number of professional friends from Rochester I attended the Illinois anniversary, and we were royally entertained. The Illinois Society undoubtedly has the distinction of successfully presenting the finest, yes, the grandest dental meeting ever held in this country at its fiftieth annual meeting in March 1914. Dr. Logan as president, a man of exceptional executive ability, performed a stupendous amount of labor, and he was ably seconded by well-selected committees, who worked harmoniously and with unanimity, all tending to the grand results attained. To all dental meetings there is attached a very important side, and that is the financial, and for that purpose and your information I give the figures of the Illinois Society:

EXPENSES.

Freight, dray, express and telegrams	$58.29
Reporting meetings 1913 and 1914	274.00
Publicity Committee	365.22
Expense of Peoria Clinic Com.	56.86
Program Committee	25.55
Public Service Com. exp.	64.57
" " " "	183.75
Honorarium of secretary	500.00
Extra help address'g env., etc.	65.74
Secretary's personal office expense:	
a Supplies	62.48
b Rent	60.00
c Stenographer	475.00
Expense committee meetings	533.85
Postage, including booster Bulletins and Transactions, printing, etc.:	
Miscellaneous printing	231.44
Membership certificates	50.00
Stationery	130.25
Bulletins, incl. booster editions	798.25
Editor's honorarium and Transactions	583.94
Expense three assistant helpers	165.00
" policeman	10.00
" printing signs, etc.	52.25
	$4846.43

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Golden Anniversary proper.

Stamps	$14.50
Special stenographer	5.00
" "	2.80
" "	1.75
Stenographer	50.00
Dr. Gallie, stenogr. and stamps	42.00
Dr. J. P. Buckley, stenogr. and stamps	89.52
Dr. D. C. Bentley, stenogr. and stamps	10.07
Facsimile letters and telegr.	62.87
Seal stamps, charts for clinics	1.75
Printing in *Dental Summary* and *Items of Interest*	36.66
Stickers	30.00
Banquet tickets	7.50
Final letter, reception com. badges, life members ladies' badges, musicale, programs, clinic cards, final programs. International Day cards, report Illinois Day clinic, banquet menu	418.75
Lapel identification pins, bronze tablets, and sketch of same	583.00
Celluloid buttons	10.00
Hotel expense, banquet	2213.75
	$3589.92
Expenses as above [page 15]	4846.43
	$8436.35
Hotel La Salle: Material for clinics, for stereopticon, exp. of essayists and banquet speakers, exhibitors' phone, tips for help, operators, etc. ($50.00), and exp. president's sec'y ($27.00)	107.37
Musical artists	110.00
Taxi musicians	10.70
Traveling exp., essayists and banquet speakers	505.00
Orchestra banquet dance	77.00
Oxford quartette	30.00
" "	30.00
Banquet treasurer's assistant	26.00
Paid accountant, auditing books	10.00
	$9336.42
Receipts (as below)	5923.20
	$3413.22

RECEIPTS.

Exhibit Committee	$4148.75
Banquet "	1774.55
	$5923.20

The number of banquet tickets sold ($2.00 per plate) was 888.

A return to Dr. Carr's letter in which he requested me to furnish him the complete file of the published proceedings covering the entire existence of the society leads me to say —It was impossible for me to honor his request, because the society is not in possession of a complete file to date. There is a written record, of course, to date, but the copies of printed annual proceedings comprise about fourteen volumes. When I became secretary there were but few complete annual volumes turned over to me. Now, in view of the existent conditions, it has occurred to me that the society should take steps to if possible secure a complete set, and deposit it in the State Library at Albany, it to remain the exclusive property of the State Society, and I recommend that the society adopt my suggestion—which, however, is based on the possibility of obtaining a complete set at a reasonable price. I understand a former secretary, Dr. Charles Butler of Buffalo, has a complete set and is willing to dispose of it.

In 1913 the By-laws were revised and two thousand copies of the revised edition were procured at a cost of $65. The supply has been reduced to about one hundred copies. In view of the amendments adopted in 1915 and others that will be adopted at the present session, and further, the passage of the new dental law, I would recommend that two thousand copies of the By-laws be procured in which all new amendments and the principal points of the new law be incorporated.

In a supplemental report I present for your consideration the various recommendations of the District Societies for examiners, councilmen, and committees; also attention is called to the vacancies of regular and alternate delegates to the National Dental Association.

The membership in good standing in nine districts on April 25, 1916, amounts to 1490 members, and 26 life members.

I am informed a special railroad fare has been authorized for the National Dental Convention, July 25th to July 28th. I would recommend that the New York State Society earnestly and fraternally invite the National Dental Association to hold the session of 1917 in New York City.

Letters from the Research Institute of the National Association will be read for your

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information and possible action. Possibly the New York State Research Committee's Report, Dr. H. W. Gillett, chairman, may be an aid to the Council in considering the appeal contained in the letters.

I take this opportunity to thank the officers, members of the Council, and members of committees with whom I have transacted business for the courteous and kindly treatment accorded me in my official capacity during the past year.

The following constitutes the expense of my office work, minus cost of stationery:

Postage for Dr. S. Palmer's circular letters, issued the latter part of 1915	$14.59
Stenography, addressing, stamping, and filling envelopes	14.75
Phone and telegraph messages, engraving gavel, expressage, postage, and miscellaneous articles	57.81
	$87.15

Herewith find attached a bill for reference to the Auditing Committee.

Respectfully submitted,

A. P. BURKHART, *Sec'y.*

Report of the Treasurer.

ALBANY, N. Y., May 12, 1916.

TO THE COUNCIL:

Gentlemen.—The treasurer respectfully presents for your consideration the attached report:

Dues to the National Association this year will be $1477.

"A" SOCIETY FUND.

Receipts.

Cash balance from 1915	$2855.84
Exhibit Committee	684.92
Interest on deposits	75.43
First District dues	894.00
Second " "	540.00
Third " "	156.00
Fourth " "	178.00
Fifth " "	192.00
Sixth " "	170.00
Seventh " "	252.00
Eighth " "	418.00
Ninth " "	154.00
	$6570.19

Disbursements.

Expenses of committees	$162.95
Essayists from abroad	270.00
Secretary's expenses	71.80
Treasurer's bond and expenses	22.74
Secretary's honorarium	200.00
Treasurer's "	100.00
Stenography and typewriting	39.98
Badges	12.14
Printing and stationery	422.25
Mailing Transactions	93.83
Committee Scientific Research	500.00
Dues to National Association	1419.00
Lantern and supplies for clinics	51.88
Flowers for Dr. Black and Mrs. Burkhart	17.70
Balance in bank	3185.92
	$6510.19

"B" LAW FUND.

Receipts.

From First District	$3000.00
From Educational Department	1315.85
	$4315.85

Disbursements.

Expense of First District	$3058.89
Paid on indebtedness to Dr. Carr	1000.00
Balance in bank	256.96
	$4315.85

"C" JARVIE MEDAL FUND.

Credits.

Balance from 1915	$55.00
Interest from bonds	50.00
Bonds	1250.00
	$1355.00

Debits.

Medal for 1915	$50.00
Medal for 1916	50.00
Bonds	1250.00
Cash balance	5.00
	$1355.00

RECAPITULATION.

Receipts.

Total balance from 1915	$2910.84
Society Fund (A)	3714.35
Law " (B)	4315.85
Jarvie " (C)	50.00
	$10,991.04

Disbursements.

Society expenses 1915-16	$3384.27
Legal expenses	4058.89
Medals	100.00
Total cash balance	3447.88
	$10,991.04

Examined and found correct:

C. A. BRADSHAW,
F. B. RHINEHART,
H. D. WHITMARSH,
Finance Committee.

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Report of the Law Committee.

ALBANY, May 13, 1916.

TO THE DENTAL SOCIETY OF THE STATE OF NEW YORK.

Mr. President and Gentlemen,—The Law Committee of the Dental Society of the State of New York herewith respectfully submits its report from May 10, 1915, to May 6, 1916.

Upon the appointing of the committee, Dr. Wm. Carr was re-elected chairman, and Wm. A. Purrington, Esq., was retained as counsel for the society for the ensuing year.

Having undergone a severe surgical operation last autumn, I have not kept as close a record of the work as heretofore, therefore this report of the committee will be substantially the report of our attorney. This is my thirty-third report as chairman of the Dental Law Committee, and I have given, unstintedly, the best years of my life for our professional interests.

I should be derelict to my duty did I not call your attention to the work accomplished by our attorney. He has labored faithfully in season and out of season in enforcing the dental law and in defending the good name of our society. His loyalty has been a detriment to him professionally, as his compensation has scarcely equaled that of the deputy assistant district attorney. I sincerely hope that this society will express its appreciation, in some suitable manner, of the valuable services he has rendered us.

I cannot refrain from giving Mr. Rothenberg, of Mr. Purrington's office, the credit which he so richly deserves in assisting in the prosecution of many cases of illegal practice.

Following are (1) abstract of report of Counsel, with annexes, (2) the committee's financial report, and (3) report of the State Audit Co. (*i.e.* State Society in acct. with the chairman of the committee from May 9, 1888, to May 6, 1916).

(1)

Report of Counsel.

May 6, 1916.

Dr. WM. CARR, Chairman Law Committee.

Dear Sir,—I submit the annual report of legal matters affecting the State Dental Society.

Since my last annual report, twenty-five cases have been initiated.

Including those then pending, twenty-nine cases have been disposed of.

There have been twenty trials, with only one acquittal; in that case the actual patient retracted statements previously made by her.

In four cases, one person being the subject of two charges, the magistrates discharged the accused upon the same degree of evidence that has sufficed to convict in many cases.

Sentence was suspended in the case of a student who practiced between the date of receiving his diploma and the date of receiving his license. Such practice is to be authorized, I understand, under the new law.

Fines.

There have been imposed in the society's cases fines amounting to $2250.

Fines collected and sent to the society, including those outstanding last year	$1600	
Fines collected from prosecutions of the Allied Dental Council	1300	
Total amount fines sent to you		$2900
Fines imposed, paid and collectible and now outstanding		735
Total		$3635

* * * * *

Sincerely yours,

WM. A. PURRINGTON.

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ANNEX "A."

(a) Cases in which warrants have been issued wherein it has not been possible to bring the accused to trial.

NAME.	COUNTY.	DATE OF WARRANT.	REMARKS.
Hunter, C. F.	New York	Nov. 25, 1902...	Fugitive.
Cook, William R.	"	" 8, 1893...	"
Adams, C. O.	"	" 12, 1897...	"
Mitchell, Ormsby	"	Feb. 21, 1898...	"
King, Archibald	Kings	Apr. 25, 1899...	"
Randell, Maurice (1)	New York	May 4, 1900...	"
Seeley, Richard	"	Dec. 6, 1902...	"
Levy, Mark	Kings	" 6, " ...	"
Packard, Frank D.	"	Jan. 26, 1904...	"
Hackett, Alice (2)	New York	May 10, " ...	"
Meade, Richard	"	Apr. 7, " ...	"
Maloney, John	"	Sept. 8, " ...	"
Dolan, John	"	Nov. 27, 1905...	"
Haganour, Henry	Oneida	Sept. 24, 1907...	"
Rubenstein, Louis	Kings	July 10, " ...	"
Marbo, Louis	"	June 26, 1908...	"
Yueck, Woo Wun	New York	Feb. 15, 1909...	Warrant unexecuted.
Hocking, T. B.	Kings	Oct. 2, 1911...	Fugitive.
Nadelson, Harry	"	Aug. 11, 1914...	Warrant unexecuted.
Davis, Walter T.	New York	Oct. 6, " ...	" "
Darling, Austin R.	"	Mar. 11, 1915...	Fugitive.
Hyman, Solomon	"	June 19, " ...	Warrant unexecuted.
Frankel, Isidor	"	Aug. 13, " ...	" "
Deane, Carl S.	"	May 7, " ...	" "

(1) This man is reported to be dead.

(2) This woman's case had always been adjourned by the court on representations that she was too ill to be brought to trial.

Note A.—"Fugitive" means one upon whom the police have failed to serve the warrant, presumably because the accused has fled the jurisdiction. Probably none of the defendants could be convicted now upon the evidence even if brought to trial. The names are carried from year to year for the sake of the record. Occasionally one of them comes above the surface, as did those named in previous reports, and A. E. McErlain (Charles Taylor), included in this list in last year's report. (See Note B.)

Note B.—The name of A. E. McErlain appeared on this list in last year's report, a warrant having been issued January 29, 1915. He was found on September 19, 1915, and arrested. He subsequently pleaded guilty and was sentenced to three months in the penitentiary. His real name was Charles Taylor.

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ANNEX "A."—*Continued.*

(*b*) Other cases pending on May 10, 1915, and their disposition, if any.

NAME.	COUNTY.	DATE OF ARREST.	RESULT.
Martin, Leon	New York	Dec. 14, 1914	Fined $200.
Gecker, Mary	"	Jan. 14, 1915	Disch'd on own recog'ee.
Robinson, Leo H.	"	May 10, "	Fined $50.
Sherwood, J. Nelson	"	Apr. 8, "	" $100.
Longo, Michael	"	" 20, "	" $100.
Applebaum, Solomon	"	" 16, "	" $100.
Romaine, George	"	" 30, "	" $100.
Fischer, George	"	May 4, "	" $100.
Weisenburn, C. J.	"	" 26 "	$200 bail forfeited.
Deane, Carl S.	"	[Annex "A" (*a*)]	Fugitive.
L. G. Langford, or Lankford.[1]			

[1] This man was reported by Dr. F. H. Conklin, of 40 Main st., Groton, N. Y., and was by me examined and placed in the hands of John D. Collins, Esq., district attorney of Tompkins county, who undertook to prosecute him. He has made no report of what he has done.

ANNEX "B."

Cases initiated since May 10, 1915.

NAME.	COUNTY.	WARRANT OR ARREST.	RESULT.
Cohn, John	New York	May 27, 1915	Disch'd on own recog'ee.
Chayes, Louis J.	"	June 11, "	Discharged by magistrate.
Hyman, Solomon	"	" 19, "	Warrant unexecuted.
Gruher, Kalman	"	July 14, "	Acquitted.
Rheinfeld, Irving	"	Aug. 10, "	Fined $400.
Frankel, Isidor	"	" 13, "	Warrant unexecuted.
Kaufman, Paul	"	" 14, "	Discharged by magistrate.
Jaulus, Alfred N.	Kings	Sept. 13, "	Fined $100.
Lief, Max R.	New York	Oct. 21, "	" $100.
Belford, Abraham	"	" 21, "	Sentence suspended.
Stoll, Victor	"	" 21, "	Disch'd on own recog'ee.
Groden, P. F.	"	" 23, "	Fined $50.
Dietz, Samuel	"	" 28, "	" $100.
Hall, Maurice	"	Sept. 23, "	" $200.
DeCamp, A.	"	Dec. 31, "	" $50.
Kessler, Jacob	"	Jan. 13, 1916	Awaiting trial.
Warner, Robert L. L.	"	" 25, "	Fined $100.
Gilman, Eli	"	" 21, "	" $100.
Koegelmeier, Albert	"	Feb. 3, "	" $50.
Santora, Frank	"	Mar. 21, "	Awaiting trial.
Waterbury, Harry H.	Kings	Apr. 4, "	" "
Chayes, Louis J.	New York	" 3, "	Discharged by magistrate.
Cassin, Stephen B.	"	" 10, "	" " "
Oleson, Walter	"	" 12, "	Fined $50.
Lopatin, William	Kings	May 3, "	Awaiting trial.

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ANNEX "C."

Results of Cases tried during the year 1915–1916.

NAME.	COUNTY.	FINE.	OTHER RESULTS.
Fischer, George	New York	$100	
Sherwood, J. Nelson	"	100	
Robinson, Leo H.	"	50	
Longo, Michael	"	100	
Romaine, George	"	100	Fine served out in prison.
Chayes, Louis J.	"	.....	Discharged by magistrate.
Kaufman, Paul	"	.....	" " "
Martin, Leon	"	200	
Taylor, Chas. (*alias* A. E. McErlain)	"	.....	3 mos. imprisonment.
Gecker, Mary	"	.....	Disch'd on own recog'ce.
Rheinfeld, Irving	"	400	
Cohn, John	"	.....	Disch'd on own recog'ce.
Hall, Maurice	"	200	
Groden, P. F.	"	50	
Belford, Abraham	"	.....	Sentence suspended.
Applebaum, Solomon	"	100	
De Camp, A.	"	50	
Dietz, Samuel	"	100	
Gruber, Kalman	"	.....	Acquitted.
Jaulus, Alfred N.	Kings	100	
Koegelmeier, Albert	New York	50	
Lief, Max R.	"	100	
Warner, Robert L. L.	"	100	
Gilman, Eli	"	100	
Cassin, Stephen B.	"	.....	Discharged by magistrate.
Weisenburn, C. J.	"	.....	$200 bail forfeited.
Chayes, Louis J.	"	.....	Discharged by magistrate.
Oleson, Walter	Kings	50	
Stoll, Victor	New York	.....	Disch'd on own recog'ce.

ANNEX "D."

Table of Fines sent to the Society during the Year 1914–1915.

(*a*) Cases tried through the office of W. A. Purrington:

Katz, William (May 5, 1915)	$50
Gray, Bennett (May 10, 1915)	100
Sherwood, J. Nelson (May 24, 1915)	100
Fischer, George (May 14, 1915)	100
Longo, Michael (June 28, 1915)	100
Robinson, Leo H. (June 11, 1915)	50
Hall, Maurice (Nov. 12, 1915)	200
Groden, P. F. (Nov. 20, 1915)	50
Rheinfeld, Irving (Oct. 29, 1915)	400
Applebaum, Solomon (Jan. 21, 1916)	100
De Camp, A. (Feb. 4, 1916)	$50
Weisenburn, C. J. (Nov. 12, 1916) [*forf.*]	200
Dietz, Samuel (Feb. 7, 1916)	100

(*b*) Cases initiated by Allied Dental Council:

Gruber, Kalman (Apr. 12, 1915)	$100
Kelner, Isidor (Apr. 27, 1915)	250
Polen, Albert (June 11, 1915)	150
Parent, John B. (Oct. 8, 1915)	50
De Felice, Carlo (Dec. 23, 1915)	200
Ferrari, Katherine (Dec. 23, 1915)	100
Krimmerman, Morris (Jan. 17, 1916)	500

ANNEX "E."

Fines imposed and outstanding.

Scheld, William (Jan. 9, 1914) balance	$35	Lief, Max R. (Mar. 3, 1916)	$100
Martin, Leon (Sept. 3, 1915)	200	Gilman, Eli (Apr. 21, 1916)	100
Jaulus, Alfred N. (Mar. 1, 1916)	100	Oleson, Walter (May 3, 1916)	50
Koegelmeier, Albert (Mar. 3, 1916)	50	Warner, Robt. L. L. (Mar. 24, 1916)	100

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ANNEX "F."

Cases pending May 8, 1916.

(*a*) Cases brought forward from past years, most of which are practically dead cases. (See Annex "A.")

(*b*) Cases in which warrants were issued during the past year.

NAME.	COUNTY.	DATE OF WARRANT.
Kessler, Jacob	New York	Jan. 13, 1916.
Santora, Frank	"	Mar. 21, "
Waterbury, Harry H.	Kings	Apr. 4, "
Lopatin, William	"	May 3, "

(*c*) Several investigations are now in charge of the agents.

(2)

Financial Report.

The receipts and disbursements from May 10, 1915, to May 6, 1916, are as follows:

City warrants forwarded by Dr. Wm. Carr to Dr. G. H. Butler, treasurer, from May 10, 1915, to May 6, 1916:

May	17,	1915	$100.00
May	29,	"	350.00
July	6,	"	250.00
July	24,	"	100.00
July	30,	1915	$150.00
Aug.	11,	"	100.00
Dec.	21,	"	250.00
Jan.	31,	1916	300.00
Feb.	3,	"	400.00
Feb.	19,	"	600.00
Mar.	7,	"	50.00
Mar.	23,	"	50.00
Mar.	28,	"	100.00
Apr.	18,	"	200.00
			$3000.00

Amounts paid by Dr. G. H. Butler, Treasurer, to Dr. Wm. Carr, chairman:

May	17,	1915	$10.30
June	3,	"	187.10
July	6,	"	182.49
July	12,	"	125.05
July	24,	"	180.90
Aug.	6,	"	91.90
Sept.	10,	"	76.00
Nov.	2,	"	184.75
Dec.	4,	"	181.40
Dec.	4,	"	182.10
Jan.	12,	1916	181.30
Feb.	18,	"	128.30
Feb.	18,	"	183.50
Mar.	7,	"	182.00
Apr.	14,	"	199.60
May	4,	"	190.15
May	4,	"	322.25
May	6,	"	269.80
May	6,	"	1000.00
			$4058.89

Paid Mr. Wm. A. Purrington, retainer and disbursements, from May 1, 1915, to May 1, 1916, as per vouchers $1864.19

Paid by Dr. Wm. Carr, chairman, to Alex. Tandlich, detective for the State Society, for services, carfares, witness fees, county clerks' certificates, etc., from May 15, 1915, to May 6, 1916, as per vouchers .. $872.45

Paid by Dr. Wm. Carr, chairman, to Miss Adelaide H. Staunton, for services as detective for State Society, from Jan. 17, 1916, to May 6, 1916, and for carfares, county clerks' certificates, witness fees, and fees for dental services and photos, including fee for Mrs. F. M. Bank, as per vouchers $322.25

Paid by Dr. G. H. Butler, treasurer, to Dr. Wm. Carr, chairman, on account of balance due, as per last report, $6692.40 ..... $1000

Note—Correct balance found by State Audit Co. to be $6723.15, leaving a balance due Dr. Carr of $5723.15.

SUMMARY.

Mr. Wm. A. Purrington	$1864.19
Alex. Tandlich	872.45
Miss Staunton	322.25
Dr. Wm. Carr	1000.00
	$4058.89

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Since the new law takes the prosecution of illegal practitioners out of the hands of the State Society, I would recommend that, as the work of the Law Committee is an important part of the history of our society, its records should be compiled by someone appointed for this purpose; and I would also recommend that the reading of these records should be made a special order of business at one of the sessions of the next meeting of the society.

Respectfully submitted,

WILLIAM CARR, *Chairman.*

Examined and found correct:

C. A. BRADSHAW,
E. B. RHINEHART,
H. D. WHITMARSH,
By-laws Committee.

(3)

Report of the State Audit Company.

STATE AUDIT COMPANY,
35 Nassau st., New York.

(*Dental Society of the State of New York in account with Dr. Wm. Carr, Chairman of the Committee on Dental Law: From May 9, 1888, to May 6, 1916.*)

Dr. WM. CARR, 302 E. 35th st., New York City.

Dear Sir,—We have made an examination of that portion of the printed reports of the annual meetings of the Dental Society of the State of New York embodying your reports as chairman of the Committee on Dental Law, for the period from May 10, 1883, to May 13, 1915. We have also examined your statement covering the period from May 13, 1915, to May 6, 1916, and have seen the vouchers covering the disbursements made by you during that period as per Schedule 2 attached. We submit herewith a statement of your account with the society for the period from May 9, 1888, to May 6, 1916.

The amounts reported as your annual cash receipts and disbursements as chairman of the Committee on Dental Law, as set forth in the printed reports examined by us, have been duly reported and accepted by the committees appointed for that purpose.

We call your attention to the fact that in the reports covering the period from May 10, 1883, the date of your appointment as chairman of the Committee on Dental Law, to May 9, 1888, there is no record of any disbursements, and it is not until the report submitted at the annual meeting of the society held on May 8, 1889, that any claim has been made by you for disbursements.

We find in the Treasurer's report submitted at the annual meeting held on May 12, 1886, a payment made to you of $100 "per resolution of the Society," which we assume was in part payment of moneys advanced by you previous to that date.

In the account submitted herewith and attached hereto the society is charged with the yearly amounts paid out by you as chairman of the Committee on Dental Law, and is credited with the yearly amounts received by you from the society on account of such disbursements from May 9, 1888, to May 6, 1916. The amount shows an excess of disbursements over receipts of $5723.15, which amount the society owed you on May 6, 1916.

In your report submitted at the meeting held on May 13, 1915, the amount stated as owing to you by the society was $6692.40, whereas the correct amount was $6723.15. The difference of $30.75 is accounted for by the facts that a balance of $30.65 owing to you May 1897 was not carried forward, and that there was an error of ten cents in the amount reported as owing to you in the report of May 1908.

We hereby certify: That all the cash shown to have been received by you from May 9, 1888, to May 6, 1916, as chairman of the Committee on Dental Law of the Dental Society of the State of New York, as per the printed annual reports of the society covering that period, and as per statement (Schedule 2) herewith, has been accounted for, and that the disbursements shown in these reports and in the statement (Schedule 1) amounted to $5723.15 in excess of the cash received, which amount was due and owing to you on May 6, 1916.

Yours truly,

State Audit Company,
E. S. BLACKWELL, *President.*

[L. S.]
Attest:
F. F. BARTROP, *Sec'y.*

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[Accompanying the report were the financial statements—*i.e.*, Account from May 9, 1888, to May 6, 1916, and the Schedules 1 and 2.]

Accounts correct: C. A. BRADSHAW,
E. B. RHINEHART,
H. D. WHITMARSH,
Finance Committee.

Report of Finance Committee on Research.

TO THE COUNCIL:

Subscriptions received and forwarded to Dr. Weston A. Price, Cleveland, Ohio, chairman of the Research Institute of the National Dental Association:

DONATIONS.

DISTRICTS.	Five years' total.	Annual amount.	Additional for current year.
First District	$300.00	$60.00	$200.00
Second "	25.00	5.00	.....
Third "	.....	.....	100.00
Fourth "	.....	.....	.....
Fifth "	65.00	13.00	100.00
Sixth "	.....	.....	100.00
Seventh "	50.00	10.00	100.00
Eighth "	.....	.....	.....
Ninth "	180.00	36.00	100.00
	$620.00	$124.00	$700.00

District Societies as above $700.00
New York Chapter, Delta Sigma Delta 200.00

Forwarded to Dr. Price $900.00
The Eighth District Dental Society has subscribed $100, which has not yet been received 100.00

Total subscriptions for year from societies $1000.00

Respectfully submitted,

HENRY W. GILLETT,
Chairman.

Report of the Committee on President's Address.

ALBANY, N. Y., May 11, 1916.

TO THE COUNCIL:

Gentlemen.—The Committee on President's Address respectfully presents for your consideration the following report:

We have listened with rapt attention to the scholarly and eloquent address of our honored president, and we hope many of the recommendations which he has made will be seriously considered, and that committees will be appointed by the incoming president to perfect plans to carry them to successful ends. We are pleased that our society has a presi-

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dent who is outspoken for preparedness, and does not want our State Society confessedly and shamefully weak in its financial and working machinery for our fiftieth anniversary celebration. He suggests that committees be appointed and started to work immediately, that this anniversary meeting may exemplify the exalted and scientific standards that our profession has attained, and that it is worthy to take its place side by side with the medical profession.

He commends most highly the work of the Research Committees of the National and the State Societies, and speaks in some length upon the important bearing and influence it has in bringing the results of our professional labors to higher standards of efficiency, and in doing so he is right. It is a shame that a majority of the rank and file of our profession do not appreciate the scientific work of our Research Committee, and thus do not give them the necessary financial assistance to carry on their work unhampered.

We are pleased to note with emphasis the suggestion that members of the several district societies should be urged and encouraged to read papers and give clinics at their own district society meetings, and thus train more active workers among ourselves for such work, and by so doing keep up interest and save expense of essayists from long distances. We do not fail to express our appreciation to the committees and individuals who have labored so long and arduously to get a new dental law passed which we confidently hope will materially elevate the morals and standards of our profession, and do away with many ills and abuses that have so long menaced a trusting public.

We believe in more dental education in our public schools, and as our president suggests, it should be pushed to the ethical limit. We heartily indorse his recommendation "that an invitation be extended to the National Dental Association to hold their session of 1917 in the city of New York, and that as our state has not been honored with the National presidency for nine years, we would appreciate the honor at this time." With him we also would recommend that our State Society appropriate a fit sum toward defraying the expense of a tablet to Mr. George Eastman of Rochester, N. Y., which has the recommendation of the National Dental Association. In the hope of having the International Dental Congress as our guest in the near future, he again urges proper preparedness, and again we agree. A fitting high tribute to the late Dr. Black, one of our honored fellowship members, is appropriately made by our president.

The president's suggestion for the election of Dr. W. A. Howe to honorary membership in the society is following the precedent already established in recognition of valuable services to the profession.

We would call the attention of the society to a little closer study of the president's suggestion to leave the manufacturing and commercial exhibitors to care for their own exhibits.

In closing, we can but speak in highest terms of appreciation of the services and sentiments Dr. Palmer has given to our profession and society as its president.

ALBERT W. TWIGGAR, *Chairman*,
E. G. PARKER.
R. H. WHITMYRE,
Committee.

Liability Insurance Committee.

ALBANY, N. Y., May 12, 1916.

TO THE COUNCIL:

Gentlemen,—The Liability Insurance Committee respectfully presents for your consideration the following report:

I have the honor to submit for your approval the proposition of the United States Fidelity and Guaranty Co. of Baltimore, Md., to insure our members against what is commonly known as "dentists' liability" under their group form of policy. Sample copies of the contract, application blanks, and member's certificates are inclosed herewith. The company states that it has issued policies of this sort to the Massachusetts Dental Association,

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the Maryland State Dental Association, and the Maryland Pharmaceutical Association.

The group plan has several apparent advantages over the present system, as follows:

(1) The cost of insurance for each member will be $10 per year; we are now paying, as individuals, from $15 to $25 each.

(2) No extra charge will be made for assistants.

(3) The company will not compromise any claim except with the written consent of the member against whom claim is made and the consent of a majority of a committee of five members of this society.

Under the group plan each member agrees to give expert testimony without charge for his time or services when requested to do so by the company. The company states that it has never yet asked any policy-holder to do this.

As a body our business will be valuable to the company, and we shall be in a position to demand the best of service. We shall also be able to dispose of suits brought by unscrupulous persons in a very satisfactory way. Under the group form of contract, when a person hits one of us he hits the whole society.

I do not believe that the society will make any mistake in accepting the proposition of this company. To accept this our Executive Council has only to pass upon the plan as submitted, and appoint some member who shall be trustee of the policy which will be issued to the society by the company. As soon as the Council does this the company will canvass our members in an endeavor to get the required number to agree to insure under this policy. An application blank will be furnished each member. If the member is not at present insured his policy will go into effect as soon as the contract is issued to the society. If he now has a policy in some other company the company will arrange to cover him upon the expiration of his contract. The company will issue the policy as soon as 250 members signify their intention of insuring under it.

November 23, 1915.

DR. HORACE P. GOULD, 181 Joralemon st., Brooklyn. N. Y.

Dear Doctor,—Referring to our recent conversation in reference to malpractice and blackmail insurance, I beg to state that I am in a position to offer to members of the Dental Society of the State of New York a policy in the United States Fidelity & Guaranty Co., a nine million dollar corporation, at ten dollars per person, annually.

The company requests that a committee shall examine into the merits of each case which may be brought against any member of the society, and instruct the company as to its disposition. The company must follow their instructions, either to fight in court, or to compromise out of court; the company, in all events, to stand all expenses, including damages, which may be awarded up to $5000 to one person, or $15.000 to more than one. In this way such litigation will be reduced to a minimum within a short period of time, when the "shyster" lawyer finds that cases against dentists are being fought in court, instead of being compromised outside. The company will probably be instructed, in the majority of cases, to fight to a finish, rather than compromise, especially in those cases which savor of blackmail. The dentist has formerly been a helpless victim of this class, which has preyed on him incessantly.

In the event that a case goes to court the society is to furnish the company gratis with expert testimony. It is not only for the company's advantage, but also for the society's, that its members should be afforded every facility to bring such cases to a successful close. In order that the members of your society may avail themselves of this offer, it is requisite that approximately 75 per cent. of the number will insure with the U. S. Fidelity & Guaranty Co., through me, taking out a policy immediately after all arrangements have been completed, if they have no insurance at present, or agree to renew their policy with us, at its expiration, if they are insured now.

As per your suggestion during our last conversation, this matter may be considered one for the State Society to pass on, which will include the district societies.

Of course, it is impossible for me to give all the details in this letter, and I shall welcome a line from you, making an appointment for me to call, to inform you further regarding this proposition.

I am enclosing herewith an extra copy of this letter for Dr. W. L. Wheeler, who is on the committee with you, in order that your joint consideration of the matter may be facilitated.

Thanking you for your uniform courtesy in the past, and awaiting an early response, I am

Yours respectfully,

F. I. ETTLINGER.

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April 28, 1916.

Dr. H. P. GOULD, 181 Joralemon st., Brooklyn, N. Y.

My dear Doctor,—I am sending to you as chairman of the Liability Insurance Committee a proposition as submitted to me by a representative of the company.

I referred him to you, but he was not sure he could call, so I will send it to be sure, and would suggest that you submit it to Council.

A representative of the U. S. Fidelity and Guaranty Co., of Baltimore, Md., called upon me, and requested that I submit the following facts pertaining to liability insurance protection.

They are willing to enter into a contract to insure the members of the State Society as follows:

(1) This body to appoint a member and designate a custodian or trustee for the contract.

(2) They request the society to simply recommend the adoption of the agreement, and they will canvass the individual members thereafter.

(3) This society will not be financially responsible for any part of contracts made.

(4) The contract is not in effect unless twenty-five per cent. of members take advantage of same.

(5) They have insured the Massachusetts Society under this method, and have practically one-third of the members at this time.

(6) The representatives felt they might be able to make the percentage a little less with our large membership.

(7) They might also be able to reduce rate.

(8) Every member would be asked to agree to give free expert testimony at trials which are against another society member—none other—excepting the actual expense of traveling and hotel expenses, for which they will be reimbursed by the company.

(9) Premium for $5000 and $15,000, which is at present $15, they will reduce to $10.50 yearly.

(10) The society action and the policies issued are not in force for more than a period of one year.

(11) The company agree not to compromise any suit without consent of the dentist against whom suit is pending.

(12) If it seems to the company advisable to compromise a suit it is to be submitted to a committee of five: One appointed by the dentist bringing suit or against whom suit is pending, one by the insurance company, and three by the State Society.

(13) They contend that many suits will be discontinued when the parties concerned realize they are not fighting an individual, but rather the Dental Society of the State of New York and the insurance company.

(14) Attached find copy of policy and contracts for your inspection.

Yours very truly,
STEPHEN PALMER.

U. S. FIDELITY, ETC., CO.

BALTIMORE, Md., May 2, 1916.

Dr. STEPHEN PALMER, President N. Y. State Dental Society:

Dear Dr. Palmer,—Inclosed herewith is a copy of the contract which we desire to issue to your society. I am also inclosing a copy of the application which must be completed by each member who desires protection under the policy, and a copy of the certificate issued to members who pay the premium charged.

We have decided that we can issue this policy if we can get 250 members to come in. You will remember that I told you that we should have to get 400. The premium for each member will be $10 instead of $10.50, and this premium will cover him against the act of any assistant for which he may become liable.

Under these conditions I can see no reason why this proposition should not go through. You will agree, I am sure, that the proposition is a very attractive one. If it is accepted we shall try to live up to our end of the contract.

After seeing you in Poughkeepsie last week I called upon Dr. Gould in Brooklyn. He said that the plan appealed to him and that he would take the matter up with Dr. Wheeler. I understand that he is going to mention the proposition to the secretary of your society in his report. I did not go into the matter in very much detail with him.

We shall try to have a representative in Albany to give you further information if you desire it. I will advise you later regarding this point. Yours very truly,

W. L. FLETCHER, *Special Representative.*

BALTIMORE, MD., May 6, 1916.

Dr. STEPHEN PALMER, Poughkeepsie, N. Y.

Dear Dr. Palmer,—Upon my return to Baltimore last week, I took up with Mr. Hill, the manager of our department, the question of having some one represent our company at your meeting in Albany next week. We do

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not wish to force this matter, but we do want to give you the best possible service. If any of your members desire to ask any questions, we want some one there who can answer them with authority.

We have been peculiarly fortunate in that we have been able to arrange with Dr. T. O. Heatwole to represent us in Albany. Dr. Heatwole, as you probably know, is both a dentist and a physician, and is dean of the Dental Department of the University of Maryland. He is a professor and lecturer on medical and dental jurisprudence.

Dr. Heatwole is a man of very high standing indeed, and is probably known to you, at least by reputation. I understand that he will arrive in Albany on May 12th, and I shall ask him to communicate with you upon his arrival. He is thoroughly familiar with the work which we have been doing for the dentists in this section of the country.

Dr. Heatwole is also a thorough gentleman, and I know that you will enjoy meeting him very much.

With very best wishes, I am,

Yours very truly,

WILLIAM FLETCHER,
Supervising Special Agent.

Respectfully submitted,

HORACE P. GOULD, *Chairman.*

Report of the Oral Hygiene Committee.

ALBANY, N. Y., May 6, 1916.

TO THE COUNCIL:

Gentlemen,—The Oral Hygiene Committee respectfully presents for your consideration the following report:

The activities of the Oral Hygiene Committee have, I believe, been greater this year than ever before in its history. As a committee, we have not accomplished as much as we hoped, but still matters have now shaped themselves so that we have definite plans for the coming year. The past year the committee endeavored to carry out the plans inaugurated by the previous chairman, but the coming year the object is to get Oral Hygiene into our public schools, by two methods. First, by the use of phonographic records bearing a simple lecture on mouth hygiene, wherever they can be installed; second, by procuring a portable machine by which our motion-picture film, "Oral Health," can be operated in the schools. We will then endeavor to place a complete outfit, film and machine, in each of the nine districts of the state, which when exhibited with an appropriate lecture must produce results.

It is quite evident that our activities must be directed principally in forming habits among the younger generation of mouth hygienic conditions that will follow them throughout life. The following report by districts pertains exclusively to work accomplished the past year.

FIRST DISTRICT.

(Waldo H. Mork. W. T. VanWinkle.)

In addition to the free clinics reported last year, public school No. 27 has one chair in operation under the supervision of the board of health; at 449 E. 121st st. there is also a clinic under the direction of the department of health; both are in charge of a dentist.

Oral Hygiene week was observed last year in the public schools when there were 74 lectures given in the First District and toothbrush drills held in VanCortland and Central Parks. A banner was presented at each place to the school showing the greatest proficiency.

Arrangements have been made for a lecture on Oral Hygiene in one of the public schools, May 1st.

We now have a committee of our own and hope to make a better report next year.

SECOND DISTRICT.

(A. H. Stevenson. H. C. Croscup.)

Our message of Oral Hygiene has been heralded far and wide throughout the city by the members of the Second District lecture staff, who gave their time and support to the work. We have entrée to the hospitals, public schools, mothers' associations, Y. M. C. A., and boy scout organizations, and the cooperation of the boards of health and education.

Last May, under the plan and direction of Dr. Ward Crampton, director of physical

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training of the board of education, and his assistants, Dr. I. H. Goldberger and Dr. F. Cohen, we designated a week beginning May 24th as Oral Hygiene week in all the public schools of Greater New York. Lectures were given to school children and instructions on how to use a tooth-brush; then on Saturday morning a competitive tooth-brush drill by boys and girls from different schools was given in Prospect Park, several of our members acting as judges. This society, through our president, awarded a red silk banner, with the words "Clean Mouth, Good Health" inscribed thereon in white silk letters, to the most proficient class. It was a very strange sight to see squads of boys and girls brushing their teeth in an exhibition contest.

The daily papers were very generous in keeping the subject before the public all week, so no one could escape who read them.

The Oral Hygiene Committee divided the work so that Dr. O. S. Long was responsible for lectures given to the hospital training schools for nurses, Dr. Henry Bade for those given to mothers' associations of the public schools.

The total number of lectures given this year on Oral Hygiene is as follows: To mothers' associations, 28; to hospital nurses' schools, 29; to public school children, 51; to Y. M. C. A., 4; to boy scout organization, 1.

THIRD DISTRICT.

(M. J. Barrett. L. S. Blatner.)

A dental clinic is maintained at the city hall, Albany, with a competent dentist, where the worthy cases of school children are given proper attention.

At the Troy Orphan Asylum the inmates are given dental attention by four Troy dentists.

FOURTH DISTRICT.

(A. S. Moore. L. A. Timerman.)

The Schenectady free dental clinic has increased its hours from one morning each week to every morning, with two paid operators in attendance, each working three half days per week.

At Canajoharie a lecture was given to the teachers of Montgomery county, and stereopticon views shown in connection with the lecture.

The following lectures have been given or arranged for: To the parents and pupils of the schools of Schuylerville; to the high school students of Saratoga Springs; to the young ladies of the Skidmore School of Arts, and to the students of the Plattsburg Normal.

At Lake Placid, several illustrated lectures were given to the parents of the public school children.

At Tupper Lake, an examination of the mouths of the school children by a dentist showed 90 per cent. in need of dental services.

The Dental Club of Amsterdam is making an effort for a free dental dispensary.

FIFTH DISTRICT.

(R. F. Casler. W. F. Tremain.)

Two lectures were given in Rome before a summer school of teachers. A free dental clinic has been opened in Utica.

SIXTH DISTRICT.

(H. D. Whitmarsh. C. M. Dunne.)

In Binghamton schools free examinations, including dental, are made. The dentists of the city have arranged to do the work for the children in the two orphanges, St. Marie's and Susquehanna Valley, which contain about 300 children. The examinations for this work and the allotments for the different dentists have been made, and the work begun. There have been two series of lectures given in the high schools on dental subjects. The motion picture film, "Oral Health," is to be shown before the schools in the near future.

The Oneonta public schools have had a series of dental lectures.

At Ithaca, one lecture on Oral Hygiene was given before the parents' and teachers' association of the Central School. The same lecture is to be given before the Cortland normal school, the first week in May. Plans are about completed for opening a free dental clinic in Ithaca in the near future.

At the Tompkins County Fair last fall the dentists examined the mouths of children in connection with the Child Welfare exhibit.

In Cortland matters are shaping for a free dental clinic.

Two Oral Hygiene lectures have been given in the Norwich schools, and one planned for Bainbridge school. The motion-picture film has been shown, and Oral Hygiene been considered in connection with the Child Welfare exhibits in Norwich.

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SEVENTH DISTRICT.

(A. W. Smith. W. W. Belcher.)

(W. R. J. Wallace, assisted by H. N. Holmes.)

Events of the epoch-making variety have occurred in the Seventh district during the past year. In July 1915, announcement was made of the gift of a dental dispensary of magnificent proportions to the city of Rochester by Mr. George Eastman. The building and equipment will cost, approximately, $300,000, which will provide for the treatment of all abnormal conditions of the mouth and contiguous parts. Mr. Eastman made two provisions to his offer—that the public should contribute $10,000 and the city $20,000 each per year for five years, the latter amount to be used for providing regular prophylactic treatments for every school child in the city. By the efforts of Mr. William Bausch twelve men besides himself volunteered to give $1000 each per year, and the city officials immediately made provision for the appropriation.

From the standpoint of Oral Hygiene the most significant part of the new institution will be the establishment of the first school in the state for the training of dental hygienists. Our committee and all other dental organizations have been expending considerable time, energy, and expense in educating the public along the lines of Oral Hygiene, but have failed to provide adequate means for caring for the mouths of the people who have profited by this teaching. It is expected that the dental hygienists will fill the breach.

The dispensaries of the Rochester Dental Society have been in continuous operation during the past year, as they have for the past twelve years. Some months ago the one in No. 4 school was destroyed when the building burned, and the work has been carried on by the other two.

In other parts of the district the work has been more or less at a standstill, with the exception of a lecture at Penn Yan by Dr. W. A. White. The motion-picture film has been shown at the plant of the Bausch & Lomb Optical Co.

EIGHTH DISTRICT.

(J. W. Beach. D. H. Young.)

Lectures on Oral Hygiene have been given at each of the following institutions in Buffalo: State normal, Hutchinson central high school, Lafayette high school, Maston Park high school, Williams St. Mothers' Club, and nurses at the Fitch crèche. No free dental dispensaries have been started during the year; however, a new one is in prospect very soon, which will give Buffalo four in all. The past year has fully demonstrated the necessity of more dispensaries, and the work accomplished has been very satisfactory.

The motion picture reel, Oral Health, has been used four times during the year and slides exhibited once. Child welfare work in Buffalo, under the direction of the department of Health, gives Oral Hygiene special significance.

NINTH DISTRICT.

(W. V. Randall. Bertram Ball.)

Over 700 patients have been treated at the St. Joseph Hospital free dental dispensary in Yonkers. Free dental dispensaries have been inaugurated during the past year at Dobbs Ferry, New Rochelle, and Mount Vernon. At the latter place an appropriation was secured, scoring a great victory over the opponents.

Several conferences have been held with the superintendent of schools of Yonkers, and within a short time a dental survey will be undertaken which is expected to be the most complete of its kind ever attempted in the public schools. The district school nurses of the city have been urged by the board of education to give a greater amount of time to the matter of instructing school children in the care of their teeth. Nevertheless, much good is being done by the school nurses and the free dental dispensaries already established.

There has been a completely equipped dispensary opened at Poughkeepsie under the supervision of the board of education and the city dental society, financed by the two bodies. The dispensary has been open six half days each since October 9, 1915, and will continue until the close of school this year. The city council has appropriated $1500 for its maintenance during the year 1916–17.

The Oral Health motion-picture film was used at Newburgh during the child welfare exhibits, and an address was made to an audience of about 600. On the evening of April 28th the dental profession of Newburgh presented the subject of a city dispensary to the board of education, and the prospects for opening one in the near future are bright.

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COMMITTEE ON ORAL HYGIENE LECTURES.

(A. H. Stevenson. H. C. Croscup. Bertram Ball.)

The committee has forwarded a copy of tentative lecture forms to the representative of each district as instructed, and suggest the adoption by the state committee at its meeting in Albany.

COMMITTEE ON STATE INSTITUTIONS.

(W. F. Tremain. M. J. Barrett. D. H. Young.)

The committee has simply held conferences with a number of superintendents and managers in regard to dental hygienists. So far as could be explained to them, they seemed to incline very favorably. The superintendents are looking for something definite in the way of better hygienic conditions. Some are eager for the improvements.

COMMITTEE ON INDUSTRIAL CLINICS.

(A. S. Moore. L. S. Blatner. W. V. Randall.)

The aim and intention of this committee was to write to different industrial institutions employing a dentist or dentists and procure data which might be used as a basis for the installation of dental dispensaries by other institutions.

In reply to a letter addressed to the following firms having dental dispensaries, certain facts attract our attention: Metropolitan Life Insurance Co., New York City. Amoskeag Manufacturing Co., Manchester, N. H. H. J. Heinz Co., Pittsburgh, Pa. Kimberly-Clark Co., Neenah, Wis. Larkin Co., Buffalo, N. Y. B. F. Goodrich Co., Akron, Ohio. Armstrong Cork Co., Pittsburgh, Pa. The above companies all make examinations, consultations, prophylactic treatments, and emergency treatments. One company does crown and bridge work, and another all work except orthodontia.

Six of the above companies charge no fee, the Larkin Co. a small fee. The operators number from one to five. Most companies employ nurses. The only work compulsory is examination and prophylaxis in 57 per cent. of the companies enumerated. Clinics have not been in operation for an adequate time to compute efficiency.

The longest time reported is by the Armstrong Cork Co., who after four years say that they are well pleased, and that their employees appreciate the services.

COMMITTEE ON MOTION-PICTURE FILM.

(A. W. Smith. W. W. Belcher. J. W. Beach.)

Since May 1915 two copies of the film have been sold, one to Mr. T. Okumura, of the Tokyo Dental College, Japan, and one to the New York State department of Health. Our rental copies have been sent to eight places: Norwich, N. Y.; Bluffton, Ind.; Calgary, Alberta, Can.; Chicago, Ill.; Utica, N. Y.; Richmond, Ind.; Binghamton, N. Y., and Newburgh, N. Y.

One copy was loaned to the Panama-Pacific Exposition, and was used continuously during the summer.

We have on hand at present four films: one not good for use, and three available for rental purposes.

STATE DEPARTMENT OF EDUCATION.

(William A. Howe, M.D., state medical inspector of schools.)

Dr. Howe reports the following:

A little more than 300 hours per week have been designated by the dentists of the state for free dental services, such designation representing practically every county in the state. Names and addresses of the dentists designating these hours have been forwarded to the district superintendents who are utilizing such privileges. I believe the plan is gradually growing in favor and is doing a great deal of good.

I am hoping to see the time, however, when dental inspection will become a real part of medical inspection, and the dentist be paid for his services just as is the physician. This is the only logical and reasonable outcome of the situation.

Lectures on Oral Hygiene have been given in the normal colleges at New Paltz, Oneonta, Brockport, Geneseo, Oswego, Buffalo, and Plattsburg. Definite arrangements have been made for lectures at the state college for teachers at Albany, and at the Fredonia and Potsdam normals.

I have really been embarrassed in this work, as in many other lines of activity, because of lack of funds. I feel, however, that eventually the general plan of medical inspection embracing dental inspection will be worked out in a very successful manner. I thoroughly appreciate the liberal co-operation and assistance which I have received from the many dentists of the state.

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As secretary-treasurer of the American School Hygiene Association, it is my intention to present a section on Oral Hygiene at its next annual meeting to be held in New York City during the week of July 3–7. This will offer an opportunity to identify Oral Hygiene with several American associations working along similar lines for the conservation of the health of the school child. I wish we might be privileged to have a large number of dentists with us on that occasion.

STATE DEPARTMENT OF HEALTH.

(T. Boynton Peck, supervisor of exhibits.)

Mr. Peck reports the following:

The State Department of Health has shown the Oral Hygiene film of the New York State Dental Society at Utica, Glens Falls, New Rochelle and Newburgh—a week in each place.

Twenty-four charts prepared by the Toronto board of health have been shown in Canton, Massena, St. Regis Falls, Philadelphia, Adams, Utica, Kingston, New Rochelle, Middletown, Cobleskill, Sidney, Red Hook, Rhinebeck, Hudson, Ossining, Port Chester, and will be shown in Lowville, Port Jervis, Binghamton, Waterville, and Canajoharie before the close of the exhibit season, July 1st.

At all of the foregoing cities named a department nurse has given two or more lectures on Oral Hygiene to school children, the number of lectures varying according to the number of pupils in the schools. The same practice has been followed in Waverly, Atlanta, Groton, Ithaca, Watkins, Alfred, Shortsville, Manchester, Troy, Glens Falls, Hoosick Falls, and Lancaster. In addition three weeks have been devoted to work with the Erie county Farm bureau in the rural districts of Erie county, in which great emphasis has been placed on Oral Hygiene. Batavia, Geneva, Auburn, Oneida, Ilion, Herkimer, and Mechanicsville will be covered before July 1st.

Owing to the fact that no appropriations have been made since 1914 for Oral Hygiene lectures, the department has been forced to devise other means of carrying on the work. In most cases it has been possible for the local dentist to talk at one or more public health meetings, and in addition, Dr. Wolfe and Dr. White, who were previously connected with the department, have given their services gratis on several occasions.

Special note should be made of the fact that in three instances—Canton, Ithaca, and Alfred—the department exhibit was a part of the farmers' week, and a very much larger number of adults were thus reached than in the other towns and cities.

RECAPITULATION.

The following summary indicates, approximately, the amount of work done throughout the state. The following figures cannot be complete, because many lectures have been given and other Oral Hygiene efforts have been made without the direction or assistance of the committee, and therefore have not been reported.

Lectures given	294
" arranged for	14
Free clinics established the past year	8
" " under consideration	8
Motion picture exhibitions	10

A number of the lectures were illustrated with stereopticon views.

Oral Hygiene is a special feature of the Medical department of the State Board of Education. Oral Hygiene receives special significance with the child welfare exhibit of the state Health department.

The Oral Hygiene Committee materially aided Dr. Howe in securing the three hundred designations for school children.

Cash on hand May 1915, $86.93; on hand May 1916, $206.88.

Respectfully submitted,

LINCOLN A. TIMERMAN.

SUPPLEMENTAL REPORT.

SUBMITTED BY H. D. WHITMARSH, TREASURER.

May 1915–May 1916.

Receipts.

1915	
May, cash on hand	$86.93
June 8, for picture film	150.00
" 18, " " "	150.00
Sept. 27, for rental	5.00
1916	
Jan. 9, for picture film	150.00
Feb. 23, rental	30.00
Mar. 6, rental	9.20
" 30, for picture film	175.00
April 18, rental	5.00
	$761.13

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Disbursements.

1915		
May 13, Rochester Mo. Pict. Co.	$100.00	
June 6, Rochester Mo. Pict. Co.	100.00	
" 6, L. A. Timerman, stationery	9.25	
" 23, M. & S. Supply House	3.50	
Sept. 13, Rochester Mo. Pict. Co.	100.00	
1916		
Feb. 9, Rochester Mo. Pict. Co.	80.50	
Mar. 6, Rochester Mo. Pict. Co.	$80.50	
" 31, Rochester Mo. Pict. Co.	80.50	
		$554.25
Balance on hand		$206.88

H. D. WHITMARSH, *Treasurer.*

Examined and found correct:

C. A. BRADSHAW,
H. D. WHITMARSH,
E. B. RHINEHART,
Finance Committee.

Report of the Fellowship Committee.

ALBANY, N. Y., May 6, 1916.

TO THE COUNCIL:

Gentlemen,—The Fellowship Committee desires to report the unanimous choice of Dr. Victor Hugo Jackson for this honorable position.

Respectfully submitted,

A. R. COOKE, *Chairman.*

Report of the Finance (Auditing) Committee.

ALBANY, N. Y., May 12, 1916.

TO THE COUNCIL:

Gentlemen,—The Finance (Auditing) Committee respectfully presents for your consideration the following:

We have examined the treasurer's accounts, and find them to be correct.

We have also accepted and approve the report of the chairman of the Law Committee.

We find the accounts of the Exhibit Committee to be acceptable and approve the same.

We have received and audited the accounts of the Program Committee.

C. A. BRADSHAW, *Chairman.*
H. D. WHITMARSH,
E. B. RHINEHART,
Committee.

Report of Special Legislative Committee.

ALBANY, N. Y., May 12, 1916.

TO THE COUNCIL:

Gentlemen,—The Special Legislative Committee beg to report as follows:

This committee, appointed under resolution of the Executive Council, empowering it "to take up the matter of dental legislation with the Regents, and draft a bill as near as possible like the one adopted by the Council at Syracuse [in 1914] and to meet the requirements of the Regents," held a meeting in New York City, at which time it went over the draft of the bill before mentioned, making

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some changes and additions thereto. Committee again met in Albany in consultation with the representatives of the Regents, and made further changes to meet their requirements. The bill was then rewritten and introduced into the Legislature, Feb. 2, 1916. The bill in Senate passed to a third reading. During the interim such changes and objections as were offered or heard of were compiled, and amendments made to the Senate bill at that time to meet them. It then passed the Senate, and was substituted in the Rules Committee for Assembly Bill No. 580. It was reported out and passed the Assembly, March 30, 1916. Bill was signed by the Governor April 5, 1916.

Your committee beg to be relieved from further duty therewith.

A. C. RICH, *Chairman.*

Report of the Legislative Committee.

ALBANY, N. Y., May 12, 1916.

TO THE COUNCIL:

Gentlemen,—The Legislative Committee respectfully presents for your consideration the attached report:

List of bills introduced in the Senate in relation to dentistry for the year 1916:

No. 382. February 22d, by Mr. Whitney, amending sections 190, 195, 196, 197, 198, 199, 200, 201, 202 and 203, public-health law, relative to the practice of dentistry, appointment of members of the state board of dental examiners, licensing of dentists, dental dispensaries, registrations and violations. (Same as A. 543.)

To Public Health Committee. March 7th, reported to committee of the whole. March 8th, amended. March 13th, to third reading. March 17th, amended. March 23d, passed. March 24th, in Assembly, Rec. No. 151. To Public Health Committee. March 30th, reported. To third reading. Passed. March 31st, to Governor. April 5th, approved. Chapter 129. Printed Nos. S. 391, 968, 1166.

No. 446. By Mr. Foley, amending subdivision "E," section 203, public-health law, by giving incorporated district dental societies having a membership of fifty or more, the power, through their officers, counsel, and agents, to aid in procuring evidence and to prefer complaints for violations of the dental laws. Fines and penalties collected for such violations are to go to the society on whose complaint prosecution is made. (Same as A. 404.)

To Public Health Committee.

No. 636. February 22d, by Mr. Spring, amending subdivision 4, section 196, public-health law, by providing that a person who, having received a certificate from the board of Regents entitling him to enter a dental college in the state, subsequently graduates from a dental college in another state or the District of Columbia, shall be eligible to take the dental examinations for admission to practice dentistry in the state. (Same as A. 854.)

To Public Health Committee. Printed No. S. 672.

No. 1140. March 23d, by Mr. Whitney, amending section 197, public-health law, by prohibiting the conferring of a dentistry degree before the candidate has filed with the institution conferring the same the Regents' certificate showing that before beginning the first annual dental course counted toward the degree he had earned as dental student a qualifying certificate in accordance with rules of the Regents, the minimum requirement of which shall be successful completion of an approved four-year high-school course, or the equivalent.

To the Public Health Committee. Printed No. S. 1298.

List of bills introduced in the Assembly in relation to dentistry, for the year 1916:

No. 404. March 27th, by Mr. McCue, amending subdivision "E," section 203, public-health law, by giving incorporated dental societies having a membership of fifty or more licensed and registered dentists, the power, through their officers, counsel and agents, to

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aid in procuring evidence and to prefer complaints for violations of the dental laws. Fines and penalties collected for such violations are to go to the society on whose complaint prosecution is made. (Same as S. 446.)

To Public Health Committee. Feb. 9th, amended and recommitted. Printed Nos. A. 410, 687.

No. 543. February 4th, by Mr. Seelye, amending sections 190, 195, 196, 197, 198, 199, 200, 201, 202 and 203, public-health law, relative to the practice of dentistry, appointment of members of the state board of dental examiners, licensing of dentists, dental dispensaries, registrations and violations. (Same as S. 382.)

To Public Health Committee.

No. 854. February 24th, by Mr. Ames, amending subdivision 4, section 196, public-health law, by providing that a person who, having received a certificate from the board of Regents entitling him to enter a dental college in the state, subsequently graduates from a dental college in another state or the District of Columbia, shall be eligible to take the dental examinations for admission to practice dentistry in the state. (Same as S. 636.)

To Public Health Committee. Printed No. A. 945.

No. 1206. March 14th, by Mr. McCue, amending sections 190, 196, 197, 199, 200, 201 and 203, public-health law, by defining and regulating the practice of dentistry, and relative to the examination, licensing, and registration of dentists, and penalties for violations.

To Public Health Committee. Printed No. A. 1402.

The Whitney-Seelye bill passed and became a law, April 5, 1916.

Respectfully submitted,

GEO. VANDERPOOL, *Chairman.*

Report of Clinic Committee.

ALBANY, N. Y., May 12, 1916.

TO THE COUNCIL:

Gentlemen,—The Clinic Committee respectfully presents for your consideration the following:

CLINICS.

Frederick L. Stanton, D.D.S., Gilbert D. Fish, C.E. "The Predetermination of the Dental Arch."

In order to give a complete demonstration of this application of engineering principles to predetermine the occlusion, a continuous clinic will be given during the three days of the meeting, in a room of the "Ten Eyck" set aside for this purpose.

(A) By means of the dental surveying apparatus maps of models will be made showing the denture in three dimensions.

(B) By means of the precision pantagraph these maps will be enlarged ten times.

(C) By means of the occlusograph the occlusion of each case will be determined and recorded on transparent paper, ten times normal scale. (This will be the first public demonstration of the occlusograph.)

(D) Booklets will be shown demonstrating the advantage of this process to all dentists practicing orthodontia: "From Malocclusion to Occlusion with the Least Tooth Movement."

Walter H. Ellis, D.D.S. (A) "Orthodontia Technique." (B) "A New Appliance for Opening Up the Bicuspid Space."

H. M. Clapp, D.D.S. "Orthodontia Treatment of Cases of Children under Seven Years of Age."

Sinclair Tousey, M.D. "Radiographic Diagnosis of Dental Infections in Systemic Diseases."

Frank J. Erbe, D.D.S. "Root-canal Treatment and Filling by the Aid of the Dental Radiograph to Prevent or Remove a Possibly Primary Cause of Heart Lesions and Articular Arthritis."

James P. Ruyl, D.D.S. "The Surgical Treatment of Abnormal Edentulous Mouths."

A. Hoffman, D.D.S. "Technique of the Snow Appliances in Prosthodontia."

Bissell B. Palmer, Jr., D.D.S. "Over-zeal-

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ous Dental Treatment, Evidenced by Extracted Teeth."

Henry L. Dunning, M.D., D.D.S. "Conductive Anesthesia."

William R. Pond, D.D.S. "Restoring the Occlusal Surfaces of Bicuspids and Molars with Amalgam."

In the future, I would suggest that the clinics be held during the entire session, so that every clinician can have ample time to demonstrate his theory, methods, or appliances to a greater number of members who wish to avail themselves of this opportunity.

CHARLES C. LINTON, *Chairman.*

Report of Committee on Arrangements.

TO THE COUNCIL:

Gentlemen,—The Arrangements Committee respectfully presents for your consideration the attached report:

Literary Program at Education building auditorium. (See appended letter.)

Executive Council at Room 302 Education building as per inclosed letter.

Exhibits have been arranged for at Hotel Ten Eyck, in the big dining-room and the ballroom.

Seven clinics have been arranged for on the second floor of the Ten Eyck.

As to Dr. Stanton's clinic for the whole three days, we agreed to pay for one day; the Ten Eyck will only charge for two days for the room; Dr. Stanton will only have to pay for one day, and the society for one day.

The Tousey, Erbe, and Dunning clinics have been arranged for in the ball-room of the Ten Eyck, and a lantern and moving-picture machine secured, which will be placed in the mezzanine gallery.

Accommodations have been secured for a stenographer for the Executive Council, at the Y. W. C. A.

A machine has been secured for the Council and delivered to Room 302 in the Education building.

Governor Whitman has been secured to deliver an address of welcome. A letter confirming the same is appended to this report.

Rooms have been secured for the guests, Dr. Bloodgood, Dr. Raper, Dr. Gilmer, Dr. Hinman, Dr. Moody, Dr. Janeway, Dr. Rogers, and Dr. Erbe.

A dinner has been arranged for on Friday evening at 7.30 o'clock, which is as early as it can be given. If it can be arranged any earlier, will do so, as the program calls for 7 o'clock. The cost of the bare dinner will be $2 each; table decorations will be about $20. We have agreed to give Mr. Lawson $25. The music will cost $17, the song-leader $5.

The direction cards have been arranged for in the Education building, and a bulletin board has been placed in the Ten Eyck lobby for like use.

The property of the society used in the Education building has been ordered sent to the Education building.

An itemized financial report will follow later, as soon as I am able to get the details.

ALBANY, December 31, 1915.

Dr. MORTON VAN LOAN, 82 S. Swan st., Albany, N. Y.

Dear Dr. Van Loan,—We are in receipt of your communication of the 23d instant, addressed to Dr. Howe, relative to the use of the auditorium in the Education building by the Dental Society of the State of New York, for their meetings to be held in Albany May 11, 12, and 13, 1916. We are pleased to grant your request, and shall reserve the auditorium for the Dental Society on the dates mentioned. We shall also be glad to hold for your use room 302 for the morning of Saturday, May 13th. Room 221, which is Dr. Howe's office, you may feel free to use, with his co-operation, for such meetings of the Executive Council as may be held in connection with the other meetings of your society.

There will be no objection to the use of the corridor about the auditorium for exhibit purposes, provided these are educational, and with the understanding that no charge will be made by your society for any of the space so used.

Very truly yours,

GEO. M. WILEY.

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EXECUTIVE CHAMBER,
ALBANY, May 2, 1916.

Dr. MORTON VAN LOAN, 82 S. Swan st., Albany, N. Y.

Dear Sir,—I write to acknowledge the receipt of your letter of April 26th, relative to the Governor's attendance at the meeting of the State Dental Society in the Education building, on Thursday, May 11th, at 10 o'clock, and to inform you that the Governor expects to be present.

Yours very truly,
LORILLARD SPENCER, *Military Sec'y.*

Respectfully submitted,
MORTON VAN LOAN, *Chairman.*

Committee on Exhibits.

ALBANY, N. Y., May 12, 1916.

TO THE COUNCIL:

Gentlemen,—The Exhibit Committee respectfully presents for your consideration the following:

Receipts.

Denver Chemical Co.	$20.00
Pittsburgh Electric Co.	16.65
J. W. Ivory	16.65
Johnson & Lund	20.00
Bristol Meyers Co.	26.64
American X-ray Equipment Co.	33.30
Aurora Dental Specialties Co.	16.65
Consolidated Dental Mfg. Co.	16.65
Colgate & Co.	33.30
Cary Safe Co.	13.32
Connecticut Coat & Cover Co.	20.00
Garhart Specialty Co.	20.00
Guarantee Dental Supply Co.	24.98
S. S. White Dental Mfg. Co.	60.00
Lavoris Chemical Co.	33.30
C. V. Mosby Co.	20.00
Oakland Chemical Co.	26.64
Chas. K. Phillips Co.	33.33
Scheidel Western X-ray Co.	26.64
Ritter Dental Mfg. Co.	66.60
S. G. Supplee	20.00
Twentieth Century Broach Co.	26.64
Weissfeld Bros.	13.32
Wappler Electric Co.	33.30
Cleveland Dental Mfg. Co.	33.33
American Surgical Specialty	13.32
Waite & Bartlett	$20.00
Borine Mfg. Co.	20.00
Kress & Owen	26.64
Kny-Scheerer Corporation	49.95
Dentists' Supply Co.	33.30
Horlick's Malted Milk Co.	26.64
Kolynos Chemical Co.	33.30
	$894.39

Expenditures.

Jan. 20, multigraphing letters	$1.50
" 20, 100 stamps	2.00
" 24, 40 "	.80
March 6, blue prints	3.00
" 24, multigraphing letters	1.50
" 24, 100 stamps	2.00
May 3, 50 "	1.00
" 8, 25 "	.50
" 8, paid assistant for addressing envelopes	4.00
" 12, carpenters	5.00
" 12, head porter	2.00
" 12, tips and incidentals	2.20
	$25.50
" 12, paid Hotel Ten Eyck Co.	327.75
Total	$353.25
Receipts	$894.39
Expenditures	353.25
Balance to be paid Dr. Butler	$541.14

L. S. BLATNER, *Chairman.*

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Committee on Forsyth Testimonial.

ALBANY, N. Y., April 15, 1916.

TO THE COUNCIL:

Gentlemen,—The Forsyth Testimonial Committee respectfully presents for your consideration the following report:

Your committee was appointed for the sole purpose of taking part in the discussion, in the House of Delegates of the National Dental Association, upon whatever project might be presented for a testimonial to Mr. Forsyth of Boston.

The sentiment in the House of Delegates seemed to be in favor of a tablet, to be placed in the Forsyth clinic.

It was regularly moved, seconded, and carried, to refer the matter to a special committee, the *personnel* of which I am unaware.

Respectfully submitted,

ELLISON HILLYER, *Chairman*.

Report of Committee on Program.

ALBANY, N. Y., May 12, 1916.

TO THE COUNCIL:

Gentlemen,—The Program Committee respectfully presents for your consideration the following:

The Program Committee is pleased to report that they delivered 1800 programs to Secretary A. P. Burkhart on the 30th of April.

The total cost of programs and envelopes was $147.26. This cost was somewhat higher than we anticipated, owing to the unstable condition of the paper market.

Secretary A. P. Burkhart wished us to express an opinion as to whether the specified amount was enough to cover the production of a suitable program, or whether they could be gotten out at less expense. We find that the only way of reducing expense materially would be to eliminate the cord ties. This, however, would make a very plain-looking program—in fact, we think too plain for an organization like the New York State Dental Society.

We wish to express our thanks to Dr. L. S. Blatner, chairman of the Exhibit Committee, and Dr. C. C. Linton, chairman of the Clinic Committee, and especially to Secretary A. P. Burkhart for his very helpful and practical suggestions regarding programs.

LEWIS H. GILBERT, *Chairman*,
J. R. SUTHERLAND,
E. F. LEWIS,
Committee.

Report of State Library Committee.

ALBANY, N. Y., May 12, 1916.

TO THE COUNCIL:

Gentlemen,—The State Library Committee respectfully presents for your consideration the attached report:

The state librarian reports that no new dental books have been purchased by the library during the past year, because there has been no use of the dental library by the dentists.

We therefore recommend that the members of the State Society avail themselves of the use of the State Library, that more books may be obtained for the use of dentists.

HERBERT L. WHEELER, *Chairman*.

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Report of Committee on Registration.

ALBANY, N. Y., May 12, 1916.

TO THE COUNCIL:

Gentlemen,—The Registration Committee respectfully presents for your consideration the attached report:

The registration book for the 1914–15 meeting was under the supervision of Miss Mabel Tallmadge, who reported 332 members and 61 guests in attendance.

For this, the 1915–16 session, Miss Isabel Mitchell is in charge, and reports 321 members and 21 guests in attendance. Badges have been provided at each meeting.

G. H. BUTLER, *Chairman.*

Report of Committee on Trained Nurses.

ALBANY, N. Y., May 11, 1916.

TO THE COUNCIL:

Gentlemen,—The Committee on Trained Nurses respectfully presents for your consideration the following report:

The purpose of the committee having been accomplished by the bill passed by the Legislature and signed by the Governor on April 5, 1916, requests their discharge from further service.

A. C. RICH, *Chairman,*
HERBERT L. WHEELER,
Committee.

Report of Committee on Ethics.

ALBANY, N. Y., May 11, 1916.

TO THE COUNCIL:

Gentlemen,—The Ethics Committee respectfully presents for your consideration the following report:

There has been no cause for action on the part of this committee during the past year.

J. N. GARLINGHOUSE, *Chairman.*

Report of Committee on Dental Service in State Institutions.

ALBANY, N. Y., May 11, 1916.

TO THE COUNCIL:

Gentlemen,—The State Dental Service Committee respectfully presents for your consideration the following report:

The chairman held a conference with Superintendent Reilly last year, and secured his approval of a plan to have a state supervisor of dentistry in the penal institutions. He also assured us we would have his co-operation in getting an appropriation therefor this year. However, when the time came his power was gone.

A correspondence with the chairman of the Ways and Means Committee of the Assembly and the Finance Committee of the Senate only brought an excuse not to do anything, on economic grounds, this year. We are to call on Superintendent Carter of the State Prison department while in Albany, and will urge his support to a plan for an appointee for this work.

The dental work is now being done by an inmate at Sing Sing and Auburn prison, and by a citizen dentist at Clinton and Great Meadow prisons.

ALBERT W. TWIGGAR, *Chairman,*
STEPHEN PALMER,
JOHN B. WEST,
Committee.

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Report of the Committee on Necrology.

ALBANY, N. Y., May 11, 1916.

TO THE COUNCIL:

Gentlemen,—The Necrology Committee respectfully presents for your consideration the following report:

With something of death's commingled sorrow and joy, your Committee on Necrology make this report. The sorrow comes out of the inevitable sense of loss to the personal circle of the deceased, and to our organization and profession. Yet joy there is, because of the divine assurance we have of the crowns of light, and the rich rewards given to the faithful workers when their work is ended.

Let us halt our busy activities for the moment while we make solemn and tender mention of the names of those friends and fellow craftsmen whom the angel of death, in dark disguise, summoned home during the past year. Only the briefest obituary is given, in some cases the barest mention of name and residence, but the life was frequently large, full, and rich, and surely in every case useful and well-beloved.

Our record, compiled from reports from the districts, may be incomplete and inaccurate, but we would hallow this page and hour by writing an honorable and affectionate "in memoriam" above the year's roll of our departed members, thus placing them on our honor roll, as we believe God has placed them on His.

IN MEMORIAM.

The following is a synopsis of the deaths which have occurred in the district societies since the session of 1915:

First district—John H. Higgins, Daniel E. Morse, and Charles D. Wright (active members). Leonard Weber (honorary member).

Second district—Daniel A. Fuller, Brooklyn.

Third district—L. R. Whitney, Troy, and E. J. Knauff, Troy.

Fourth district—Wm. E. Snyder, Amsterdam.

Fifth district—I. C. Curtis, Fulton.

Sixth district—L. E. Knapp, Deposit, E. D. Downs, Owego, Edson J. Pritchard, Hancock, and John Erwin, Elmira.

Ninth district—Fred W. Sweezy, Port Jervis.

The district records thus show that twelve active members have passed away since our last session.

During the past year two of the most eminent men in the dental profession representative of the East and the central West have passed away. We refer to Dr. James Truman of Philadelphia and Dr. G. V. Black of Chicago, Ill. They became Fellows of the New York State Dental Society and received the Jarvie medal.

As teachers in the respective colleges with which they were connected for many years they were eminent. As writers and authors their names and fame will endure among dentists in all countries of the globe where dentistry is practiced.

In their efforts to disseminate dental knowledge there was no display of egotism; instead, there always appeared in word and action simplicity of manner and earnestness, which left an everlasting impression on the minds of thousands of students whose privilege and pleasure it was to have them as instructors.

Their gentle and kindly voices are hushed forever, but their labors shall live after them, and the dental profession for many years will honor their memories.

Respectfully submitted,

C. C. BACHMAN, *Chairman*,
W. D. TRACY,
W. G. LEWIS,
Committee.

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REPORTS FROM THE DISTRICT SOCIETIES.

First District.

THE annual meeting of the First District Dental Society of the State of New York was held on April 3, 1916, and the following persons were elected officers for the ensuing year:

President—W. B. Dunning.
Vice-president—Chas. F. Ash.
Recording Secretary—Leland Barrett.
Corresponding Secretary—J. Russell Watson.
Treasurer—Bissell B. Palmer, Jr.
Editor—Wm. J. Lederer.
Librarian (appointed, not elected)—B. W. Weinberger.
Executive Committee—F. C. Kemple, Matthew Carney, and S. E. Davenport, Jr. (*chairman*).
Supervisor of Sections—O. J. Chase, Jr.

The following were elected to serve on State Society committees: C. F. Ash (Law); W. C. Fisher (Legislative); W. H. Mork and W. T. Van Winkle (Oral Hygiene).

The usual scientific meetings of this society were held on the first Monday evening of each month, October to March inclusive, with one extra meeting to hear Dr. Hartzell, there being very good attendance at every meeting.

The topics were as follows: October—"Dentistry, a Blessing and a Curse," by M. I. Schamberg. "Emetin *vs.* Surgery in Pyorrhea," by T. B. Hartzell. November—"Report of the Society's Research on Dental Caries," by W. J. Gies. December—"Bacteriology in its Relation to Dental Practice," by Nathaniel Gildersleeve. January—"Elimination of Pain in Dental Practice," by J. E. Nyman. February—"Partial Dentures," by W. E. Cummer. March—"Possibilities of Amalgam in Broken-down Molars," by M. L. Ward.

The afternoon clinics and the dinners prior to the evening meetings were exceedingly popular, and no doubt will be continued.

We regret to report the death of the following members: John H. Higgins, Daniel E. Morse, and Chas. D. Wright (active); D. H. Allis, John L. Crater, D. A. Fuller, P. B. McCullough, H. B. McFadden, and C. N. Peirce (associate); G. V. Black, James Truman, and Leonard Weber (honorary).

Following the revision of the membership lists, we find that the society has, on April 25, 1916, 447 active, 270 associate, and 49 honorary members, making a total of 766, all in good standing.

Respectfully submitted,
LELAND BARRETT, *Rec. Sec'y.*

ACTIVE MEMBERS.

Abel, L. Hosford, 8 W. 40th st.
Adams, Irving F., 160 W. 106th st.
Addelston, W. M., 73 E. 92d st.
Agostini, E. M., 97 Central Park West.
Andrade, Alex., 123 W. 95th st.
Arkin, David M., 150 W. 87th st.
Armstrong, Herbert R., 200 W. 72d st.
Aronson, Geo. G., 507 Fifth ave.
Aronstein, William, 507 Fifth ave.
Asch, Andrew J., 331 Madison ave.
Asch, Jacob, 331 Madison ave.
Ash, Chas. F., 115 Broadway.
Babcock, Ralph W., 140 W. 57th st.
Baker, David C., 516 Fifth ave.
Baker, Edward W., 119 W. 121st st.
Baldwin, Harold L., 40 E. 41st st.
Baldwin, L. C., 167 W. 71st st.
Ballin, Irving J., 164 E. 72d st.
Bark, Arthur W., 779 Madison ave.
Barker, Clinton Reed, 57 W. 50th st.
Barnard, Wm. E., 40 E. 41st st.
Barrett, Leland, 220 W. 98th st.

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Bate, Jacob, 758 West End ave.
Baumann, Harry G., 103 Park ave.
Beekman, A. Russell, 24 E. 48th st.
Beiser, H. Everett, 250 W. 74th st.
Bendernagel, James F., 451 West End ave.
Benney, Walter, 17 E. 38th st.
Berlin, Simon, 1800 Seventh ave.
Betzig, Edward P., 417 E. 143d st.
Beyer, Fritz A., 168 E. 38th st.
Bickel, Otto, 701 Madison ave.
Bishop, Edward A., 386 Audubon ave.
Birkhahn, Alex. M., 302 Central Park West.
Blakeslee, Geo. W., 157 W. 93d st.
Blattstein, Leon, 133 W. 72d st.
Bleyer, Leroy, 230 W. 79th st.
Bluhm, Maurice M., 965 Tiffany st., Bronx.
Blum, Richard, 576 Fifth ave.
Blum, Theodor, 140 W. 57th st.
Bogue, Edward A., 63 W. 48th st.
Bogue, Fred L., 63 W. 48th st.
Bohn, L. W., 55 W. 95th st.
Bonnefond, Montecelle A., 10 W. 61st st.
Bourne, A. R., 174 W. 79th st.
Bowman, Harry, 108 E. 73d st.
Brandt, Henry, 200 W. 113th st.
Brash, W. W., 1554 Broadway.
Brazill, Manuel J., 2090 Seventh ave.
Brazier, R. Horace, 125 E. 24th st.
Breen, John M., 115 E. 17th st.
Brice, James H., 144 E. 19th st.
Brophy, Chas J., 3456 Broadway.
Browne, Chas. L., 200 W. 57th st.
Brown, Irving W., 260 W. 72d st.
Brown, M. Hart, 1511 E. Chester road.
Brush, F. C., 1181 Broadway.
Bryer, Russell K., 515 Madison ave.
Buckley, John F., 272 Willis ave.
Burgess, Jas. K., Singer Bldg.
Burke, J. Willard, 8 W. 40th st.
Burns, Bert A., 8 W. 40th st.
Burt, John D., 40 E. 41st st.
Burton, I. G., 1482 Broadway.
Butler, E. Santley, 576 Fifth ave.
Buxbaum, A. I. F., 341 Madison ave.
Byers, J. M., 303 Fifth ave.
Carleton, S. S., 171 W. 71st st.
Carman, Herman F., 343 E. 142d st.
Campbell, Guy, 253 Columbus ave.
Carney, Matthew F., 51 E. 42d st.
Carr, Wm., 375 Park ave.
Carrabine, Oscar, 542 Fifth ave.
Chase, O. J., Jr., 17 E. 38th st.
Chayes, Herman E. S., 576 Fifth ave.
Chicherio, F. A., 235 W. 129th st.
Clayton, Walter H., 423 W. 120th st.
Cloney, Thomas F., 28 W. 39th st.
Cloud, Agnes D., 449 W. 23d st.
Cohen, Bernhard, 315 Fifth ave.
Colburn, M. L., 600 W. 157th st.
Colburn, Walter H., 176 W. 72d st.
Cole, C. Monford, 616 Madison ave.
Cole, J. P., Dobbs Ferry, N. Y.
Collins, Martin L., 2001 Fifth ave.
Concklin, Edward F., 44 E. 64th st.
Converse, J. S., 42 W. 40th st.
Cowles, Ward H., 1993 Boston road.
Cotton, Waite A., 240 W. 74th st.
Crookshank, F. A., 849 E. 156th st.
Cudlipp, Edwin, 167 W. 71st st.
Currie, Alex. W., 40 E. 41st st.
Dailey, Wilbur M., 19 E. 69th st.
Davenport, F. N., 33 W. 42d st.
Davenport, R. M., 51 W. 47th st.
Davenport, Sebert E., 51 W. 47th st.
Davenport, Sebert E., Jr., 51 W. 47th st.
Deane, Harry T., 616 Madison ave.
Deane, Wm. C., 616 Madison ave.
Degenhardt, M., 230 W. 97th st.
Degenhardt, William F., 1125 Lexington ave.
Delaney, John T., 1378 Lexington ave.
Delano, Frank S., 802 World Bldg.
Deschler, George L., 38 E. 61st st.
De Sola, S., 333 Central Park West.
De Wolfe, Edward R., 1730 Broadway.
Dickinson, J. W., 542 Fifth ave.
Dills, Wm. B., 33 W. 42d st.
Dingman, Florence, 167 W. 71st st.
Dixon, Edwin H., 40 E. 41st st.
Doxtater, L. W., 675 Madison ave.
Draper, Wm. H., 11 E. 48th st.
Dunning, Henry S., 17 E. 38th st.
Dunning, Wm. B., 140 W. 57th st.
Durschang, A. C., 321 E. 17th st.
Eakin, Stanley H., 18 E. 41st st.
Easton, B. A., 66 Market st., Poughkeepsie.
Eddy, G. M., 618 Fifth ave.
Elster, Robert E., 201 W. 108th st.
Emerson, C. H., 167 W. 71st st.
Epstein, Michael, 15 W. 44th st.
Erganian, J. K., 175 Fifth ave.
Evans, Harry P., 44 E. 64th st.
Evans, George, 55 W. 39th st.
Fairchild, Beatrice C., 23 E. 126th st.
Ferris, Henry C., 104 E. 40th st.
Fischer, Edward W., 202 W. 74th st.
Fisher, Wm. C., 373 Fifth ave.
Fletcher, Cecil Gray, 527 Fifth ave.
Fletcher, C. R., 167 W. 71st st.

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Force, Willard B., 576 Fifth ave.
Forstein, D. R., 575 W. 175th st.
Fossume, Finn S., 616 Madison ave.
Fox, Edward, 252 W. 79th st.
Francis, W. E., 47 W. 34th st.
Franken, Sigmund W., 36 E. 40th st.
Freedman, Anna G., 275 Central Park West.
Freund, J. F., 113 W. 84th st.
Fulton, John G., 116 W. 59th st.
Gardner, Walter H., 597 Fifth ave.
Gates, Albert W., 606 W. 116th st.
Getz, Forry R., 576 Fifth ave.
Getzoff, Samuel M., 33 W. 42d st.
Gibbs, John R., Jr., 149 Broadway.
Gibson, Kasson C., 115 W. 77th st.
Gies, Carl J., 315 E. 86th st.
Gillett, Henry W., 140 W. 57th st.
Gluck, Ernest, 152 E. 111th st.
Goldberg, Harry A., 2 W. 86th st.
Goode, Gladstone, 576 Fifth ave.
Gottschaldt, Martin C., 40 E. 41st st.
Grace, Thomas M., 167 W. 71st st.
Green, Leo, 44 E. 75th st.
Greenbaum, Leo, 741 Fifth ave.
Griffin, Francis D., 164 W. 73d st.
Gudewill, R. H. E., 30 W. 59th st.
Gunn, Andrew H., 40 E. 41st st.
Gunton, Leonard M., 40 E. 41st st.
Guthrie, Percy H., 170 Broadway.
Haas, Arthur, 8 West 40th st.
Haigh, Herbert, 329 Amsterdam ave.
Halgren, Charles C., 915 Seventh ave.
Hammer, H. F., 69 E. 55th st.
Hargett, Arthur V., 2016 Seventh ave.
Hart, Harriette, 142 W. 71st st.
Hartman, Wm. N., 167 W. 71st st.
Harvitt, Joseph, 214 E. Broadway.
Hasbrouck, Jas. F., 40 E. 41st st.
Hasbrouck, J. Roswell, 171 W. 71st st.
Hassell, Samuel W., 118 W. 71st st.
Heckard, Wm. A., 489 Fifth ave.
Heinzer, Edward A., Amsterdam ave. and 99th st.
Heller, Chas. A., 171 E. 116th st.
Hellman, Milo, 40 E. 41st st.
Herbert, Wm. C., 576 Fifth ave.
Herbst, Max, 4 New Chambers st.
Hermans, Jas., 167 W. 71st st.
Herzog, Jerome, 54 E. 93d st.
Hess, Samuel, 818 Lexington ave.
Hill, D. A., 1295 Fulton ave.
Hills, Wm. B., 307 E. 18th st.
Hlavac, Chas. W., 240 E. 69th st.
Hoag, Wm. J., 331 Madison ave.
Hobby, G. W., 167 W. 71st st.
Hoblitzell, C. M., 431 Convent ave.
Holdridge, P. A., 157 W. 79th st.
Houston, H. C., 69 Sixth ave.
Howe, Frank Morgan, 113 E. 60th st.
Howells, Edward W., 31 W. 47th st.
Hull, Geo. A., 123 W. 73d st.
Hull, Henry J., 40 E. 41st st.
Hussa, Philip, 8 W. 40th st.
Hutchinson, R. G., Jr., 8 W. 40th st.
Igel, Victor, 420 Albemarle road, Brooklyn.
Ireland, Alice J., 44 W. 47th st.
Irving, Wm. W., 40 E. 41st st.
Jackson, Victor H., 40 E. 41st st.
Jenkins, G. R., 40 E. 41st st.
Jernigan, Geo. F., 61 W. 56th st.
Jones, Lawrence H., 2 Wall st.
Kaemmerer, Henry A., 1130 Fox st.
Karmiohl, Jacob, 340 E. 72d st.
Kaplan, Emanuel M., 136 Liberty st.
Kauffer, H. J., 112 W. 72d st.
Kaufman, John L., 1723 Madison ave.
Kauffman, Jos. H., 601 W. 177th st.
Keith, Ross H., 185 Madison ave.
Kelly, O. R., 200 W. 72d st.
Kelsey, Ernest A., 2001 Fifth ave.
Kemple, Frederick C., 576 Fifth ave.
Kennard, Louis W., 542 Fifth ave.
Kennedy, Clement D., 119 E. 60th st.
Kennedy, Edward, 347 Fifth ave.
Kessler, Samuel J., 528 W. 111th st.
Kimball, C. Denney, 40 E. 41st st.
Knecht, Wm. D., 40 E. 41st st.
Kohn, Alfred L., 341 Madison ave.
Krows, Earl, 126 W. 126th st.
Kreisler, David, 133 W. 72d st.
Lambert, H., 122 E. 74th st.
Lang, Joseph, 116 W. 59th st.
La Roche, Montgomery, 704 Madison ave.
Lazarnick, Louis L., 255 W. 88th st.
Lederer, Wm. J., 150 E. 74th st.
Leggett, Geo. H., 133 W. 123d st.
Lekowski, Victor, 133 W. 72d st.
LeRoy, Louis C., 38 W. 50th st.
Lester, Wm. B., Park Row Building.
Levene, Benj. L., 161 W. 86th st.
Levy, Joseph M., 1277 Madison ave.
Liebrecht, Chas. F., 203 W. 81st st.
Lindsay, Elmer A., 36 E. 40th st.
Lindsay, Harley B., 40 E. 41st st.
Linton, Chas. C., 40 E. 41st st.
Litten, Arthur S., 238 W. 78th st.
Locherty, Jas. B., 229 W. 78th st.
Loomis, H. A., 33 W. 72d st.

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Lowenstein, Julius, 971 Second ave.
Lowenstein, M. S., 2 W. 94th st.
Lyke, J. Hyatt, 219 W. 86th st.
McGrath, S. W., 321 E. 17th st.
McKenzie, James, Jr., 57 W. 84th st.
McLaren, Francis J., 500 Fifth ave.
McNaughton, Stuart H., 63 W. 49th st.
McNeille, Chas. S., 500 Fifth ave.
McNeille, Perry R., 500 Fifth ave.
MacNicholl, W. A., 104 W. 123d st.
Macdonald, Wm. D., 576 Fifth ave.
Macknight, Thomas S., 63 W. 48th st.
Madsen, M. P., 201 W. 94th st.
Maller, J. W., 303 E. 161st st.
Mann, Joseph, 317 Second ave.
Manney, G. A., 101 E. 92d st.
Manville, Geo. P., 576 Fifth ave.
Marco, B. Barrymore, Hotel Ansonia.
Marshall, H. G., 144 W. 126th st.
Mattes, Otto, 241 W. 14th st.
Matteson, George E., 150 W. 104th st.
Meeker, John B., 223 W. 89th st.
Mehlig, Carl F. C., 527 Fifth ave.
Merritt, Arthur H., 59 W. 46th st.
Metzger, Otto I., 135 Central Park West.
Meyer, John H., 161 W. 71st st.
Miller, Alonzo B., 542 Fifth ave.
Miller, Arthur, 2880 Broadway.
Minner, Edmund E., 144 W. 92d st.
Mishnun, Harry, 601 W. 137th st.
Mitchell, Vethake E., 17 E. 38th st.
Mobley, Lewis K., 46 W. 51st st.
Monroe, Thomas H., 437 Fifth ave.
Moolten, Raphael J., 35 W. 42d st.
Mork, Waldo H., 1882 Grand Concourse.
Moss, Michael L., 307 E. 86th st.
Nagel, Harold, 228 Audubon ave.
Nash, Benj. C., 143 W. 81st st.
Nash, Louis, 15 Columbus Circle.
Newgarden, Charles, 564 W. 160th st.
Nickerson, Ernest W., 101 W. 72d st.
Niles, F. B., 2139 Seventh ave.
Noll, Joseph A., 501 W. 138th st.
O'Brian, L. A., 542 Fifth ave.
Oeder, Andrew H., 631 E. 168th st.
Ogden, Harry B., 130 W. 57th st.
Onderdonk, Thos., 542 Fifth ave.
Ottolengui, R., 80 W. 40th st.
Palmer, Bissell B., 220 W. 98th st.
Palmer, Bissell B., Jr., 40 E. 41st st.
Palmer, Corydon, 231 W. 97th st.
Palmer, Delos, 48 W. 50th st.
Palmer, Geo. B., 40 E. 41st st.
Parker, Horace J., 40 E. 41st st.
Paulsen, M. A., 2041 Fifth ave.
Paymer, Edward, 308 E. 79th st.
Pease, J. Grant, 61 W. 74th st.
Perez, José G., 315 Fifth ave.
Perkins, Bertram R., 40 E. 41st st.
Peters, August L., 125 E. 64th st.
Peters, Henry H., 260 W. 72d st.
Peters, John L., 133 W. 72d st.
Phillips, Henry H., 1722 Aeolian Hall.
Polhamus, Agnes I., 98 Morningside ave.
Potter, Howard M., 413 W. 136th st.
Pratt, Frederick W., 46 W. 51st st.
Prensky, William S., 507 Fifth ave.
Prentiss, Elias B., 130 W. 57th st.
Price, Sherman B., 24 E. 48th st.
Quendenfeldt, Paul B. H., 570 Bergen ave.
Rabell, Chas. Francis, 40 E. 41st st.
Randolph, W. F., 1328 Broadway.
Ranhofer, Edward J., 65 W. 70th st.
Rathfelder, G. C., 300 W. 107th st.
Raymond, E. H., Jr., 542 Fifth ave.
Ream, F. K., Aeolian Hall.
Reed, J. Howard, 33 W. 42d st.
Refsum, Joseph, 832 Lexington ave.
Reitz, Ralph B., 576 Fifth ave.
Requa, J. Eugene, 616 Madison ave.
Rettich, Hugo, 52 W. 68th st.
Rhein, M. L., 38 E. 61st st.
Riblet, E. Briggs, 351 W. 45th st.
Rice, Geo. E., 24 E. 48th st.
Richardson, C. C., 292 W. 92d st.
Riggs, Wm. D., 24 E. 48th st.
Rivinius, Julius W., 173 W. 73d st.
Robinson, Edwin S., 28 W. 39th st.
Ros, Osvaldo, 452 Fifth ave.
Rosenbaum, Wm., 219 W. 86th st.
Rosalsky, Harry W., 230 W. 97th st.
Root, John C., 24 E. 48th st.
Rothkranz, W. C., 30 E. 42d st.
Rouse, Arthur G., 576 Fifth ave.
Rouse, A. G., Jr., 576 Fifth ave.
Roy, Frank Austin, 527 Fifth ave.
Roy, Harold, 527 Fifth ave.
Rubricius, Frank I., 217 E. 72d st.
Rubsam, Chas. W., 140 W. 57th st.
Ruyl, J. P., 40 E. 41st st.
Ryan, E. P. R., 452 Fifth ave.
Ryan, T. J., 200 Fifth ave.
Salsbury, Henry L., 120 W. 86th st.
Salvatore, Victor P., 582 Second st., Brooklyn.
San, Henry, 17 E. 38th st.
Sanford, E. A., 33 W. 45th st.
Schamberg, Morris I., 116 W. 59th st.
Schiff, Wm. G., 231 W. 125th st.

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Schnaper, Samuel, 860 Lexington ave.
Schwamm, Henry, 174 E. 74th st.
Schwarz, Frederick J., 261 W. 21st st.
Scobey, Harry C., 116 W. 59th st.
Scudder, Chas., 17 E. 38th st.
Senior, Eugene, 333 Central Park West.
Shaw, Geo. M., 40 E. 41st st.
Sheckter, Samuel J., 1849 Madison ave.
Sherry, Ernest, 301 W. 109th st.
Shields, Nelson T., 61 W. 56th st.
Short, Wm. B., 52 Vanderbilt ave.
Simon, Samuel, 794 Lexington ave.
Sinnigen, Walter C., 560 Fifth ave.
Skalmer, M., 124 E. 95th st.
Skidmore, J. L., 250 W. 74th st.
Smith, Edward C., 17 E. 38th st.
Smith, Fred E., 576 Fifth ave.
Smith, Karl C., 576 Fifth ave.
Snider, Edward E., 1 W. 127th st.
Solow, L. J., 33 W. 42d st.
Spencer, H. W., 437 Fifth ave.
Spengeman, Percy G., 400 W. 152d st.
Spring, Wm. A., 8 W. 40th st.
Stack, Wm. H., 488 Tremont ave.
Stanley, Rolof B., 11 E. 48th st.
Stanton, Fred'k L., 28 W. 39th st.
Stark, A. Burton, 505 Fifth ave.
Starr, Alfred Russell, 8 W. 40th st.
Steeves, S. A., 33 W. 42d st.
Stein, Gustave R., 144 W. 123d st.
Stern, Henry G., 3671 Broadway.
Stern, Leo, 924 West End ave.
Stewart, Howard T., 59 W. 46th st.
Stier, Julius J., 226 W. 78th st.
Stillman, Paul R., 115 Broadway.
Stoney, Arthur C., 515 Madison ave.
Strance, A. G., 315 Central Park West.
Strauss, Milton A., 2412 Seventh ave.
Strohmeyer, Joseph J., 167 W. 71st st.
Strong, Irving E., 1059 Tinton ave.
Sutherland, Arnold H., 28 W. 39th st.
Sweetser, R. W., 18 W. 34th st.
Swift, Arthur L., 140 W. 57th st.
Sylla, E. W., 597 Fifth ave.
Taggart, Robert W., 330 Alexander ave.
Taylor, C. S., 102 W. 93d st.
Taylor, J. Ostram, 576 Fifth ave.
Taylor, James W., 88 Central Park West.
Taylor, Herbert W., 58 W. 50th st.
Terrell, Geo. B., 40 E. 41st st.
Thomas, J. D. V., 1 W. 34th st.
Thompson, Daniel B., 133 W. 72d st.
Throop, Harold M., 1384 Lexington ave.
Tomlinson, Edward S., 40 E. 41st st.
Tooley, Francis L., 157 E. 79th st.
Tousey, Sinclair, 140 W. 57th st.
Tracy, Martin C., 46 W. 51st st.
Tracy, Wm. Dwight, 46 W. 51st st.
Trattner, Henry, 171 E. 81st st.
Turcot, F. G., 546 Fifth ave.
Turner, Frederick C., 505 Fifth ave.
Turner, W. J., 19 W. 54th st.
Tyrrell, Wm. Bell, 521 W. 111th st.
Van Saun, S. W., 250 W. 74th st.
Van Winkle, W. T., 59 W. 46th st.
Vaughan, Harold T., 616 Madison ave.
Vaughan, Ray G., 24 E. 48th st.
Veith, Jas. H., 924 West End ave.
Vetter, Charles, 2 W. 88th st.
Vuilleumier, J. A., 58 E. 58th St.
Waddell, R. W., 45 W. 34th st.
Wald, Armin, 323 E. 86th st.
Walker, Wm. Wallace, 58 W. 50th st.
Walker, Alfred S., 38 W. 59th st.
Wardwell, Claison S., 576 Fifth ave.
Watson, John Russell, 576 Fifth ave.
Waugh, Leuman M., 576 Fifth ave.
Webster, William Lloyd, 101 W. 78th st.
Weed, Thos. M., 464 W. 145th st.
Wehrenberg, W. D., 133 W. 72d st.
Weinberger, B. W., 40 E. 41st st.
Weld, Geo. W., 16 E. 23d st.
Weller, Franklin B., 239 W. 103d st.
Westbay, Henry E., 219 W. 71st st.
Wheeler, C. W. B., 17 E. 38th st.
Wheeler, Herbert L., 560 Fifth ave.
Wheeler, Isaiah N., 60 W. 51st st.
White, John E., 1328 Broadway.
White, W. D., Jr., 331 Madison ave.
Whitlock, W. Melvin, 11 E. 48th st.
Whitney, Edward P., 54 W. 48th st.
Willcox, Harry, 516 Fifth ave.
Willis, Geo. P., 949 Lexington ave.
Wilson, Geo. A., 542 Fifth ave.
Wilson, George A., Jr., 33 W. 42d st.
Wilson, Lawton H., 576 Fifth ave.
Witt, William, 1090 St. Nicholas ave.
Wolff, Alexander, 141 E. 34th st.
Wollison, R. M., 576 Fifth ave.
Wyant, Wm. M., 201 W. 55th st.
Young, J. Lowe, 576 Fifth ave.
Zentler, Arthur, 8 W. 40th st.
Zimmerman, G. H., 167 W. 93d st.
Zweig, Jacob, 115 W. 119th st.

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HONORARY MEMBERS.

Ainsworth, George C., Boston, Mass.
Andrews, Prof. R. R., Cambridge, Mass.
Berens, T. Passmore, 35 Park ave., N. Y. C.
Brophy, Truman W., Chicago, Ill.
Breneman, A. A. (Ph.D.), New York City.
Bryan, L. C., Basel, Switzerland.
Bryant, Wm. S., 57 W. 53d st., N. Y. C.
Case, Calvin S., Chicago, Ill.
Croll, W. L., London, Eng.
Cryer, Matthew H., Philadelphia, Pa.
Darby, Edwin T., Philadelphia, Pa.
Davenport, I. B., Paris, France.
Delevan, D. Bryson, 1 E. 33d st., N. Y. C.
Elliott, W., St. George, 331 Madison ave., N. Y. C.
Gaylord, Edward S., New Haven, Conn.
Gies, Prof. William J., 437 W. 59th st., Columbia University, N. Y.
Goadby, Kenneth Weldon, London W., Eng.
Godon, Charles, Paris, France.
Goslee, Hart J., Chicago, Ill.
Grevers, John E., Utrecht, Holland.
Gysi, Alfred, Zurich, Switzerland.
Harmstad, Frank C., Jersey City, N. J.
Harvey, L. F., Buffalo, N. Y.
Hatch, Henry D., Temple, Maine.
Head, Joseph, Philadelphia, Pa.
Herbst, Wilhelm, Bremen, Germany.
Hodson, J. F. P., New York City.
Ingersoll, Laman C., Keokuk, Iowa.
Jarvie, William, Montclair, N. J.
Kimball, C. O., 40 E. 41st st., N. Y. C.
Kirk, Edward C., Philadelphia, Pa.
Lewis, F. Parke, Buffalo, N. Y.
Lloyd-Williams, E., London, S. W., England.
McManus, James, Hartford, Conn.
McQuillen, Daniel Neill, Philadelphia, Pa.
Marshall, John S., Washington, D. C.
Morton, William J., 19 E. 28th st., N. Y. C.
Newton, Richard C., Montclair, N. J.
Ormiston, Robert, Brooklyn, N. Y.
Osborn, Prof. H. F., 850 Madison ave., N. Y. C.
Phillips, Wendell C., 40 W. 47th st., N. Y. C.
Pullen, H. A., Buffalo, N. Y.
Taggart, William H., Chicago, Ill.
Tomes, Charles S., London, England.
Waite, W. H., Liverpool, England.
Williams, J. Leon, London, England.
Wilson, Frederick N., 3 E. 48th st., N. Y. C.
Wortman, Prof. J. L., New Haven, Conn.
Younger, William J., Paris, France.

Second District.

THE annual meeting of the Second District Dental Society of the State of New York was held April 10, 1916, and the following persons were elected officers for the ensuing year:

President—W. N. Frazer.
Vice-president—F. T. Van Woert.
Recording Secretary—G. W. Gardner.
Corresponding Secretary—W. S. Watson.
Treasurer—C. A. Gomer.
Librarian—T. A. Quinlan.
State Dental Examiners—F. C. Walker and A. H. Stevenson.
Members of Executive Council—H. P. Gould (regular), W. N. Frazer (alternate).

The following were elected to serve on State Society committees: R. Ottolengui (Law); F. O. Kraemer (Legislative); A. H. Stevenson and H. C. Croscup (Oral Hygiene).

The membership of the society was increased by 12 new members during the year; making a total of 278 members, of which 265 are active, 7 life, and 6 honorary.

There were seven regular meetings held, at five of which papers were read and discussed, namely, (1) "The Present Aspect of the Endamœbiosis Question in Pyorrhea," by Dr. M. T. Barrett of Philadelphia, Pa. (2) "Crown and Bridge Work, Safe and Sane," by Dr. A. W. Thornton of McGill University, Montreal, Can. (3) "A Plea for the Removal of Healthy Rather than Diseased Pulps," by Dr. I. N. Broomell of Philadelphia, Pa. (4) "The Absence of Standards in Crown and Bridge Work," by Forest H. Orton of University of Minnesota. (5) "Factors to be

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Considered in the Retention of Teeth to be Used as Abutments in Bridge Work," by Dr. Karl G. Knoche and Dr. E. J. Aisen, Chicago, Ill.

Deceased—Dr. D. A. Fuller, 184 Joralemon st., Brooklyn.

Respectfully submitted,
G. W. GARDNER, *Rec. Sec'y.*

ACTIVE MEMBERS.

(Resident in Brooklyn unless otherwise specified.)

Adams, F. R., 861 Manhattan ave.
Allen, C. C., 105 Clinton st.
Allen, N. H., 444 Franklin ave.
Allyn, F. L., Woodhaven, N. Y.
Arvine, F. B., 793 Lincoln Place.
Ayers, Herbert D., 93 Amity st., Flushing, N. Y.
Babcock, E. H., 184 Joralemon st.
Babcock, L. H., 2118 Beverly road.
Bade, Henry, 136 Halsey st.
Barker, D. W., 87 Lafayette ave.
Barnes, F. D., 178 Stuyvesant ave.
Bartlett, Harry M., 945 Park Place.
Bauer, August F., 154 Nassau St., N. Y. C.
Bauer, W. C., 1116 Bushwick ave.
Beissel, William J., 1004 Broadway.
Berendsohn, E. H., 204 Berkeley Place.
Berendsohn, W. A., 598 Carlton ave.
Boley, Jerome A., 11 Weirfield st.
Bornman, Carl F., 67 Hanson Place.
Boudin, Anna P., 477 E. 16th st.
Boylhart, Fred'k, 129 St. Felix st.
Brown, Byron, 77 Hanson Place.
Brown, J. B., 80 Lafayette ave.
Buchenholz, Ira, 258 Hart st.
Buckley, W. A., Liberty, N. Y.
Burgess, F. L., Huntington, L. I.
Bush, C. A., 126 Hancock st.
Bush, W. N., 183 Halsey st.
Brown, H. W., 110 S. Elliott Place.
Burgun, J. A., 184 Joralemon st.
Bush, R. C., Huntington, L. I.
Campbell, D. K., 436 Gold st.
Carpenter, Walter Titus, 191 Ryerson st.
Chambers, E. J. C., 280 Flatbush ave.
Childs, Henry M., 67 Hanson Place.
Clark, Robert H., 350 Carlton ave.
Clark, W. G., 103 Montague st.
Clark, W. P., 26 Seventh ave.
Clasing, J. F. W., 283 President st.
Clayton, Furman, 469 Franklin ave.
Coe, Thomas C., 508 E. 5th st.
Cook, Frank W., 44 Court st.
Cook, J. D., 81 Reid ave.
Croscup, H. C., 327 Sterling Place.
Crossman, Victor W., 136 Fort Greene Place.
Cuinet, L. A., 152 Henry st.
Cuneo, C. M., 2118 Beverly road.
Davis, George E., 1612 Broadway.
Dayton, C. R., 488 Nostrand ave.
Deale, W. H., Babylon, N. Y.
De Bar, William, 260 Ovington ave.
Desnoes, A. M., 488 Nostrand ave.
Dills, W. B., 140 W. 57th st., N. Y. C.
Douglass, George Crawford, 540 Putnam ave.
Dunlop, Charles Harman, 145 Halsey st.
Easley, Shirley H., 17 Covert st., Port Washington, N. Y.
Edwards, LeRoy S., 113 S. Elliott Place.
Engel, P. B., 10 Stuyvesant ave.
Engel, W. F., 10 Stuyvesant ave.
Ewald, Martha R., 1211 ave. N.
Ferris, H. C., 67 Hanson Place.
Filler, Julius, 68 McKibben st.
Finney, J. H., 333 McDonough st.
Fischler, Bernard, 120 Reid ave.
Frazer, Wm. N., 184 McDonough st.
Fuchs, W. J., 199 Gates ave.
Fuller, Z. P., 110 S. Elliott Place.
Gardner, G. W., 184 Joralemon st.
Gelson, J. Norbert, 282 Park Place.
Gesell, Herbert R., 709 Manhattan ave.
Gilcrest, H. C., Nyack, N. Y.
Gilman, R. E., 33 Lafayette ave.
Glenzer, J. A., 593 Hancock st.
Glover, B. W., 34 Clarkson st.
Goldberger, M. M., 1932 Bergen st.
Gomer, Charles A., 770 Willoughby ave.
Gough, F. A., 184 Joralemon st.
Gould, Horace P., 181 Joralemon st.
Green, H. C., 228 Cumberland st.
Griesmer, M. F., 364 McDonough st.
Greenberg, A., 4721 14th st.
Haas, H., 240 Covert st.
Haley, J. F., 840 Herkimer st.
Halsey, W. E., 203 Jefferson ave.
Hamlet, F. P., Hempstead, N. Y.
Hankinson, M. C., 201 Schermerhorn st.
Harby, R. D., 792 Lincoln Place.
Held, John W., 826 Rogers ave.
Heilig, S. E., 280 Flatbush ave.
Herman, Leo, 4721 12th ave.

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Hesse, Carl E., 1159 Broadway.
Hillyer, Ellison, 1143 Dean st.
Hirschman, H. S., 296 Richmond ave., Port Richmond, Staten Island, N. Y.
Hoch, B. L., 130 Reid ave.
Holbrook, E. A., 148 Hancock st.
Holch, Henry G., 155 Gates ave.
Holmboe, Birger, 162 Montague st.
Holmes, J. H., 107-a Halsey st.
Holzman, Mayer P., 1024 Bushwick ave.
Hopkins, S. P., 184 Joralemon st.
Husch, Jacob, 269½ Vernon ave.
Huskinson, Ernest C., 1246 Pacific st.
Hyatt, T. P., 17 E. 38th st., N. Y. C.
Hummel, C. F., 184 Joralemon st.
Jones, C. C., 828 Flatbush ave.
Jarvie, Wm., 19 W. 54th st., N. Y. C.
Joffe, Maxwell S., 72 Manhattan ave.
Johnson, A. S., 1203 Dean st.
Johnston, Will H., 35 Fort Greene Place.
Kaletsky, C. Myron, 297 Fulton st., Jamaica, N. Y.
Kalkbrenner, Carl E., 2421 Silver st.
Keowen, S. S., 24 New York ave.
Keppy, F. B., 62 Hancock st.
Ketcham, F. S., 141 Hancock st.
King, Horace W., 85 Main st., Flushing, N. Y.
Knight, G. W., 28 Cambridge Place.
Knox, John T., 184 Joralemon st.
Kohn, Leonard, 184 Cornelia st.
Koob, Joseph J., 401 Grove st.
Kraemer, F. O., 225 Schermerhorn st.
Kraemer, F. O., Jr., 225 Schermerhorn st.
Kregeloh, H. A., 170 N. 6th st.
LaBorne, Chas H., 792 Nostrand ave.
Lanchantin, E. F., 360-a Ninth st.
Lando, Samuel A., 27 Grand ave., Corona, N. Y.
Lawrence, Augustin L., 85 Main st., Flushing, N. Y.
Lawrence, W. E., 1 Revere Place.
Lehmann, E., 194 Ridgwood ave.
Leonard, M. D., 854 Flatbush ave.
Leonard, R. G., 854 Flatbush ave.
Leprohon, J. B., 105 Quincy st.
Lewis, J. M., 50 Lenox road.
Lewis, Warrington G., 184 Joralemon st.
Lief, J. F., 12 Graham ave.
Lienau, R. C., 137 Bainbridge st.
Long, Orville S., 781 Ocean ave.
Lundgren, C. J., 1241 Broadway.
MacDonald, C. F., 154 Clinton st.
Machat, B. B., 8679 20th ave.
Malcolm, James A., Oyster Bay, N. Y.
Mapp, C. J., 44 Court st.
Marshall, E. W., 144 Park Place.
Master, E. A., 181 Joralemon st.
Matt, O. T., 696 Park Place.
McAteer, J. L., 4426 18th ave
McCushing, George J. B., 3013 Jamaica ave., Richmond Hill, N. Y.
McNeill, E. W., 65 St. Johns Place.
Megaw, Elmer E., 1166 Dean st.
Merwin, R. E., 796 Carroll st.
Michnoff, S. J., Bay Shore, N. Y.
Miller, Frank Henry, 310 Cumberland st.
Miller, F. H., 562 Bainbridge st.
Miller, Irving U., 284 Henry st.
Mogk, William C., 223 St. Nicholas ave.
Morris, Frank, 1151 Dean st.
Morris, W. A., 657-a Macon st.
Morrison, E. V., 67 Hanson Place.
Muth, George H., 1124 Ocean ave.
Moss, H. M., 327 Eastern Parkway.
Newton, H. A., 151 Clinton st.
Nies, Frederick H., 79 Hamilton ave.
Nodine, A. M., 8 W. 40th st., N. Y. C.
Norcom, C. M., 1187 Bergen st.
O'Brien, H. L., 104 Prospect Park W.
O'Connell, M. F., Corona, N. Y.
Orr, C. W., 100 Hanson Place.
Ottolengui, R., 80 W. 40th st., N. Y. C.
Orth, Frederick C., 612 Benedict ave., Woodhaven, N. Y.
Paaswell, Benjamin, 974 St. Mark's ave.
Parker, Clinton B., 154 Clinton st.
Parker, DeWitt L., 178 State st.
Parker, Douglas B., 154 Clinton st.
Parker, V. F., 124 Montague st.
Pensak, Julius, 1476 Pitkin ave.
Perlie, H. E., 1430 G st. N. W., Washington, D. C.
Peterson, J. O., 216 Bergen st.
Peterson, Theodore O., 158 6th ave.
Phillips, P. J., 129 S. Oxford st.
Powell, J. K., Jr., 175 Hancock st.
Provost, W. D., 80 Lafayette ave.
Quackenbush, Hattie W., 473 Washington ave.
Quinlan, J. S., 76 6th ave.
Quinlan, T. A., 463 Fulton st.
Quinn, A. M., 16 Seventh ave.
Ralph, Edward D., 40 Flushing ave., Jamaica, N. Y.
Reese, R. H., 103 Macon st.
Riggs, W. C., 67 Hanson Place.
Rippier, E. T., 354 Ninth st.
Ritt, Adolph, 1621 Pitkin ave.
Rogers, W. H., 506 Hancock st.

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Rosenthal, Adolph D., 248 Fulton ave., Hempstead, N. Y.
Rose, H. S., 157 Clinton st.
Royce, F. C., 65 Greene ave.
Russell, J. W., 6 Plaza st.
Ruyl, J. P., 18 Ashford st.
Sanbern, Frank, 184 Joralemon st.
Sanderson, R. H., 76 Rogers ave.
Sandhusen, George, 298 Cumberland st.
Sandiford, H. E., 73 St. Mark's ave.
Scammon, Herbert Leon, Riverhead, N. Y.
Scheiner, Karl, 1829 Gates ave.
Schreiber, George J., 758 Flushing ave.
Schumacher, Frank H., 1307 Bushwick ave.
Schmidt, J. A., 1195 Dean st.
Scofield, F. E., 87 Macon st.
Scofield, W. L., Brewster, N. Y.
Seaver, A. D., 134 Park Place.
Sexton, E. K., 632 Throop ave.
Shankroff, Louis, 343 Jefferson ave.
Shapiro, Benjamin, 1480 Eastern Parkway.
Shapiro, Benjamin D., 1808 Prospect Place.
Shapiro, Jacob, 430 Stone ave.
Shapiro, Simon, 1174 Eastern Parkway.
Shea, Bernard F., 324 Stuyvesant ave.
Shields, J. S., 585 Jefferson ave.
Shuayerson, Samuel, 61 Tompkins ave.
Siqueland, Theo., 67 Hanson Place.
Sloman, John J., 731 Hancock st.
Small, E. W., 1571 Broadway.
Smith, Charles E., Mineola, N. Y.
Specht, E., 209 Union st.
Snyder, L. A., 108 S. Portland ave.
Solomons, J. R., 1 W. 34th st., N. Y. C.
Staats, George E., 718 Macon st.
Steinbuch, Wm., 940 Bushwick ave.
Stevenson, A. H., 1619 Cortelyou road.
Stillman, E. E., 178 Prospect Park West.
Stillman, J. C., 184 Joralemon st.
Stoltze, V. A., 436 Gold st.
Strong, W. A., 214-a Livingston st.
Sullivan, J. E., 360 Tompkins ave.
Sullivan, W. F., 60 Broadway, N. Y. C.
Thompson, W. W., 383 Hancock st.
Toshack, E. W., 267 New York ave.
Turner, Wm. J., 19 W. 54th st., N. Y. C.
Tuttle, J. H., Jr., 184 Joralemon st.
Tuck, W. M., 484 8th st.
Van Note, F. L., 512 Ocean ave.
Van Orden, Chas. A., 144 Lawrence st.
Van Woert, C. T., 184 Joralemon st.
Van Woert, F. T., 184 Joralemon st.
Voegtlen, P. G., 441 9th st.
Voelker, Charles C., 899 Union st.
Walker, F. C., 309 State st.
Wallace, E. C., 50 Macon st.
Warden, F. E., 242 McDonough st.
Warren, Edward B., 11 Schenck ave.
Washburn, E. P., 416 50th st.
Watson, Walter S., 5 McDonough st.
Webb, Thomas C., 8687 22d ave.
Weiskotten, R. H., 133 Hewes st.
Wengorovius, W. R., 35 W. 42d st., N. Y. C.
Whaley, E. G., 642 Park Place.
Whitcomb, C. B., 148 Hancock st.
White, G. W., 309 13th st.
Wicks, J. V. P., 108 Fort Greene Place.
William, Maurice, 699 Manhattan ave.
Wilson, W. W., 485 Lafayette ave.
Wolf, P. F., 1025 Bushwick ave.
Wolkin, George, 241 Euclid ave.
Wood, John, 38 Halsey st.
Woodle, Jerome M., 1024 Halsey st.
Wyckoff, J. R., 279 Madison st.
Zametkin, Joel M., 7724 14th ave.
Zulauf, A. F., 1195 Dean st.

HONORARY MEMBERS.

Ash, Charles F., 115 Broadway, N. Y. C.
Goslee, H. J., 108 N. State St., Chicago, Ill.
Hutchinson, R. G., Jr., 8 W. 40th st., N. Y. C.
Jackson, V. H., 40 E. 41st st,, N. Y. C.
Jenkins, N. S., Paris, France.
Taggart, W. H., 538 S. Clark st., Chicago, Ill.

LIFE MEMBERS.

Abbott, F. P., 33 Cambridge Place.
Emerson, F. S., 632 Bedford ave.
Holly, R. T., 155 Montague st.
Houghton, O. E., 126 S. Oxford st.
Hull, P. L., Jamaica, N. Y.
Parker, E. G., Goshen, N. Y.
Ramsdell, W. M., Oxford, Chenango Co., N. Y.

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Third District.

THE annual meeting of the Third District Dental Society of the State of New York was held April 18, 1916, and the following persons were elected officers for the ensuing year:

President—Richard Ellis.
Vice-president—J. H. Carter.
Recording Secretary—J. W. Canaday, Jr.
Corresponding Secretary—George Caddick.
Treasurer—P. S. Oakley.
Editor—E. H. Gale.

The following were appointed to serve on State Society committees: Morton Van Loan (Law); George Vanderpool (Legislative); M. E. Brown and H. G. Kittell (Oral Hygiene).

During the past year we have lost two members by death—Drs. L. R. Whitney and E. G. Knauff, both of Troy, and one dropped for non-payment of dues—Dr. C. T. Harris of Hudson.

At our annual meeting we elected three new members—Drs. J. L. Appleton, Jr., D. K. McDonald, and R. A. Murphy, all of Albany.

The annual meeting was unusually well attended, the entire afternoon being devoted to a consideration of the "Waugh Radiographic Unit."

The members of the Fourth District Dental Society were our guests at that time, we having been their guests at their annual meeting in January at Schenectady.

Respectfully submitted,
J. W. CANADAY, JR., *Rec. Sec'y.*

ACTIVE MEMBERS.

Allen, C. E., 24 Dove st., Albany.
Ames, F. L., 64 Swan st., Albany.
Amyot, B. E., 67 Remsen st., Cohoes.
Amyot, J. A., Kar. Building, Cohoes.
Appleton, G. N., 5 Ten Broeck st., Albany.
Appleton, J. L., 522 Madison ave., Albany.
Appleton, J. L., Jr., 522 Madison ave., Albany.
Barlow, G. T., Hudson.
Barrett, M. J., 1830 Fifth ave., Troy.
Behrens, H., Jr., Kingston.
Bennett, E. A., 401 Main st., Catskill.
Betts, F. S., Kingston.
Bird, C. H., 59 Fourth st., Troy.
Bishop, C. H., Kingston.
Blatner, L. S., 346 State st., Albany.
Boudrias, Louis, 257 Columbia st., Cohoes.
Brown, M. E., 90 State st., Albany.
Caddick, Geo., 53 Dove st., Albany.
Canaday, J. W., 283 State st., Albany.
Canaday, J. W., Jr., 283 State st., Albany.
Carter, C. D., Kingston.
Carter, J. H., 142 Remsen st., Cohoes.
Clarke, G. H., Kingston.
Conkling, W. A., Catskill.
Cragin, A. M., Kingston.
Cragin, C. B., Kingston.
Doyle, T. A., 157 Central ave., Albany.
Ellis, Richard, 54 Fourth st., Troy.
Englert, G. A., 360 Main st., Catskill.
Fabyan, W. D., Philmont.
Fallon, H. C., 812 River st., Troy.
Fitzgerald, M. A., 99 N. Pearl st., Albany.
Fitzsimmons, J. A., 37 Central ave., Albany.
Gale, E. H., 90 State st., Albany.
Gale, L. J., 18 S. Pearl st., Albany.
Gallico, J. E., 40 Third st., Troy.
Hawkins, F. F., 95 Fourth st., Troy.
Herbert, O. N., Troy.
Hudson, W. A., 94 Washington ave., Albany.
James, L. R., Hudson.
Ketner, F. W., 481 Warren st., Hudson.
Kirwan, M. F., 31 Central ave., Albany.
Kittell, H. G., 620 Second ave., Troy.
Knapp, G. O., 41 Fourth st., Troy.
Le Blanc, P. A., 32 N. Pearl st., Albany.
Levitas, S. T., Kingston.
Lynam, H. D., 351 Broadway, Troy.
McCarthy, W. E., 457 Broadway, Troy.
McCormack, E. P., 95 N. Pearl st., Albany.
McCormick, F. S., 46 Third st., Troy.
McCormick, J. J., 453 Broadway, Troy.
McDonald, D. K., 61 Columbia st., Albany.
McKeon, F. J., 64 N. Pearl st., Albany.
Maby, E. R., Mechanicsville.
Mann, Josiah, Middleburgh.
Michael, R. C., Philmont.
Michel, F. G., 52 N. Pearl st., Albany.
Murphy, Alice, Hoosick Falls.
Murphy, R. A., Eagle st., Albany.
Norton, A. J., 114 Market st., Saugerties.
O'Brien, F. D., 82 Swan st., Albany.
Oakley, P. S., 1647 Fifth ave., Troy.

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Perras, E. A., Troy.
Rieger, A. B., 105 Mohawk st., Cohoes.
Reynolds, S. S., 25 Central ave., Albany.
Rowe, M. L., 142 Washington ave., Albany.
Rowley, H. S., 35 High st., Hoosick Falls.
Scranton, S. A., Schoharie.
Stevens, W. E., Windham.
Sullivan, G. A., 18 Dove st., Albany.
Vanderpool, Geo., 90 State st., Albany.
Van Loan, Morton, 82 Swan st., Albany.
Van Vleck, C. K., 536 Warren st., Hudson.
Warren, W. A., 1569 First ave., Watervliet.
Weston, R. B., 355 State st., Albany.
Whitbeck, T. H., 44 Eagle st., Albany.
Wright, A. M., 4 St. Paul Place, Troy.
Young, G. B., 78 Fourth st., Troy.

HONORARY MEMBERS.

Angle, Edward H., New London, Conn.
McKay, Jos., Troy.
Shields, Nelson T., New York City.

LIFE MEMBERS.

Garvey, P. S., Hudson.
Nelson, H. G., 49 Fourth st., Troy.
Young, E. J., 108 Third st., Troy.

Fourth District.

THE annual meeting of the Fourth District Dental Society of the State of New York was held January 18, 1916, and the following persons were elected officers for the ensuing year:

President—Earl Timeson.
Vice-president—G. H. Hiney.
Recording Secretary—H. V. Gregg.
Corresponding Secretary—R. D. Sayre.
Treasurer—O. J. Gross.
Librarian—(Sec'y).
State Dental Examiner (term to expire 1918)—O. J. Gross, Schenectady.
Members of Executive Council—A. C. Rich (regular), Saratoga, and L. A. Timerman (alternate), Fort Plain.

The following were appointed to serve on State Society committees: R. H. Whitmyre (Law); E. B. Rhinehart (Legislative); L. A. Timerman and A. S. Moore (Oral Hygiene).

Respectfully submitted,
HARRY V. GREGG, *Sec'y*,

ACTIVE MEMBERS.

Alexander, Wm. H., Johnstown.
Amyot, P. A., Schenectady.
Barraclough, J., Hudson Falls.
Betts, George M., Schenectady.
Brown, George, Glens Falls.
Callahan, Wm. C., Johnstown.
Carpenter, B. F., Whitehall.
Chesebrough, Henry E., Greenwich.
Clark, F. P., Mechanicsville.
Coleman, S. C., Malone.
Colgrove, W. H., Johnstown.
Collins, J. A., Glens Falls.
Collins, J. H., Granville.
Cooney, T. S., Schenectady.
Culliney, Miles M., Greenwich.
Cunningham, Arthur J., Warrensburg.
Day, F. C., Lake Placid.
Demarest, S. A., Glens Falls.
Duignan, R. E., Gloversville.
Embler, Ralph, Schenectady.
Facteau, Henry H., Tupper Lake.
Fielding, F. A., Glens Falls.
Finkle, Clarence A., Amsterdam.
Foote, LeRoy, Saratoga.
Foote, N. E., Whitehall.
Foulds, T. H., Glens Falls.
Gabler, Lewis C., Schenectady.
Gaffney, Joseph F., Amsterdam.
Garrett, Walter L., Glens Falls.
Githins, W. L., Fort Edward.
Goetz, St. Elmo, Schenectady.
Gregg, H. V., Schenectady.
Grennan, F. T., Schenectady.
Gross, O. J., Schenectady.
Hasels, Frederick W., Schenectady.
Hastings, Jas. M., Saratoga.

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Haynen, A. H., Glens Falls.
Hill, Robt. C., Schenectady.
Hiney, G. H., Cambridge.
Hodder, C. A., Canajoharie.
Hull, J. B., Schenectady.
Jackson, H. C., Schenectady.
Kinum, Albert G., Schenectady.
Lord, C. N., Schenectady.
McCann, A. H., Glens Falls.
McCarthy, Frank Paquette, Schenectady.
McCullough, E., Gloversville.
McNulty, Thomas P., Gouverneur.
Mabie, Wm. A., Amsterdam.
Maier, Paul, Schenectady.
Maloney, J. D., Hudson Falls.
Mead, Harold R., Schenectady.
Merrihew, P. P., Quaker Street.
Moore, A. S., Schenectady.
Munroe, John A., Saranac Lake.
Murnighan, Richard J., Amsterdam.
Petrie, Raymond C., Johnstown.
Porter, R. N., Malone.
Powers, N. C., Saratoga.
Rhinehart, E. B., Schenectady.
Rich, A. C., Saratoga.
Roberts, David S., Gloversville.
Rose, W. S., Schenectady.
Rose, Wilbur D., Schenectady.
Sayre, R. D., Gloversville.
Scott, Robt. J., Port Henry.
Shannon, George H., Cambridge.
Shaw, E. D., Gloversville.
Sitterly, A. T., Schenectady.
Steer, H. G., Fort Plain.
Stowitts, H. M., Amsterdam.
Taylor, F. E., Malone.
Tibbetts, W. H., Ballston Spa.
Timerman, L. A., Fort Plain.
Timeson, Earl, Schenectady.
Van Alstyne, Earl Z., Schenectady.
Van Wie, P. B., Canajoharie.
Vaughan, Herbert E., Ogdensburg.
Ward, G. E. T., Schenectady.
Wark, J. Finley, Corinth.
Webster, C. E., Gouverneur.
White, Charles N., Granville.
White, James D., Amsterdam.
Whitmyre, R. H., Schenectady.
Wilkinson, W. F., Warrensburg.
Wilson, Wm. H., Saranac Lake.
Wood, Edward A., Mechanicsville.
Woolsey, George, Fonda.
Wright, Frank, Ticonderoga.
Yates, G. H., Fort Edward.

HONORARY MEMBERS.

Burnett, J. K., Fort Plain.
Garrett, James S., Glens Falls.

LIFE MEMBERS.

Doolittle, E., Schuylerville.
Hawley, A. F., Waterford.
Rossiter, A. A., Saratoga.
Weed, P. W., Saratoga.

Fifth District.

THE annual meeting of the Fifth District Dental Society of the State of New York was held April 14 and 15, 1916, and the following persons were elected officers for the ensuing year:

President—E. R. Webb, Syracuse.
Vice-president—A. M. Lafayette, Syracuse.
Recording Secretary—B. T. Mason, Fulton.
Corresponding Sec'y—E. Shotafer, Utica.
Treasurer—Harold S. Slocum, Oswego.
Censors—S. Slocum, Oswego, E. R. Harrington, Watertown, G. H. Butler, Syracuse.
State Dental Examiners—A. R. Cooke, Syracuse, and Sheridan Slocum, Oswego.
Members of Executive Council—G. B. Beach (regular), Syracuse, and Sheridan Slocum (alternate), Oswego.

The following were appointed to serve on State Society committees: I. J. Coe (Law); T. R. Cullen (Legislative); G. B. Parker and E. A. Smith (Oral Hygiene).

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Two regular meetings were held during the past year, the semi-annual at Syracuse in union with the Sixth, Seventh, and Eighth districts, and the annual at Syracuse.

Ten new members were taken in during the year. One death occurred—Dr. I. C. Curtis of Fulton.

Respectfully submitted,

B. T. MASON, *Sec'y.*

ACTIVE MEMBERS.

Barker, W. A., 202 Bastable Bldg., Syracuse.
Barnes, C. H., 912 University Bldg., Syracuse.
Barrett, J. J., 515 Union Building, Syracuse.
Benz, F. W., 622 Onondaga Bank Building, Syracuse.
Benz, J. C., 622 Onondaga Bank Building, Syracuse.
Beach, G. B., 518 S. A. & K. Bldg., Syracuse.
Bickelhaupt, A. C., 315 Kirk Bldg., Syracuse.
Billington, B. H., 2 Hendricks Bldg., Syracuse.
Bradshaw, C. A., 402 S. Salina st., Syracuse.
Brasted, Geo. H., Utica.
Butler, G. H., 715 University Bldg., Syracuse.
Capron, W. B., Utica.
Carroll, J. F., 309 Kirk Block, Syracuse.
Cary, Fred L., Fulton
Clapp, H. M., Utica.
Clifford, W. D., 427 N. Salina st., Syracuse.
Coe, I. J., Baldwinsville.
Cooke, A. R., 815 University Bldg., Syracuse.
Coxon, Rose, 409 Mayro Building, Utica.
Craner, C. M., 903 University Bldg., Syracuse.
Cullen, T. R., 2 Wickes Building, Oswego.
Cummings, J. E., 513 Onondaga Bank Bldg., Syracuse.
Davis, C. H., Jefferson st., Pulaski.
Davis, John L., 304 Dillaye Bldg., Syracuse.
Dommett, H. M., Ilion.
Dower, J. H., 427 University Bldg., Syracuse.
Earl, Fred W., 11–12 Y. M. C. A. Building, Watertown.
Eicholtz, Robt. W., Univ. Bldg., Syracuse.
Engle, W. F., Liverpool.
Everleigh, E. J. 213 James st., Syracuse.
Fisher, F. W., 419 Union Building, Syracuse.
Fowler, C. S., Watertown.
Garlinghouse, J. N., Clinton.
Gillick, F. M., Theresa.
Gould, L. A., 413 Charleb. Bldg., Watertown.
Gowland, W. G., 515 Kirk Building, Syracuse.
Grout, J. J., Skaneateles.
Guillaume, H. F., Utica.
Hall, J. S., 423 University Bldg., Syracuse.
Harrington, E. E., Watertown.
Harrington, E. I., Watertown.
Hatfield, Wm. H., Utica.
Head, G. T., 314 Dillaye Building, Syracuse.
Heintz, W. J., 614 Columbia st., Utica.
Hetzelberger, A. C., Utica.
Jones, R. E., Remsen.
Jones, W. B., 317 Union Building, Syracuse.
Jones, W. H., Clinton.
Kelley, J. Otis, 325 Rosenbloom Building, Syracuse.
Kratzer, E. R., Baldwinsville.
Lafayette, A. M., 725 Univ. Bldg., Syracuse.
Leak, W. H., Watertown.
Luther, H. E., 801 Onondaga Bank Bldg., Syracuse.
McAlpin, R. A., 118 South st., Utica.
McCraith, T. E., 221 Genesee st., Utica.
Markham, P. M., 910 Univ. Bldg., Syracuse.
Mason, B. T., Fulton.
Mills, F. L., 55 W. Genesee st., Baldwinsville.
Mount, M. T., Cato.
Moyer, W. H., 12 W. Genesee st., Baldwinsville.
Murry, W. G., Herkimer.
Neff, E. R., Carthage.
Osgood, A. K., Ilion.
Parker, G. B., Watertown.
Perry, G. L., 318 Union Building, Syracuse.
Peters, C. J., 812 Univ. Bldg., Syracuse.
Platner, L. W., Utica.
Potter, Geo. A., Cape Vincent.
Prichard, J. T., Camden.
Redway, R. B., Ilion.
Retter, A., Utica.
Roblin, H. M., Onondaga Bk. Bldg., Syracuse.
Roth, G. S., 510 Gurney Building, Syracuse.
Ryan, C. M., 512 University Bldg., Syracuse.
Sayers, C. A., 514 Gurney Building, Syracuse.
Schamu, C. G., 702 Univ. Bldg., Syracuse.
Shotthafer, Edward, Utica.
Silverman, I. J., 541 E. Genesee st., Syracuse.
Slocum, Harold S., Oswego.
Slocum, Sheridan, Oswego.
Smith, A. F., 514 Univ. Bldg., Syracuse.
Smith, E. A., Rome.
Spriggs, C. J., Farmers Bank Building, Rome.
Stillman, A. A., 620 Gurney Bldg., Syracuse.
Sullivan, J. C., Little Falls.

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Talley, Dyer B., 714 Dillaye Bldg., Syracuse.
Tomkins, H. H., Utica.
Tremain, W. F., 203 W. Dominick st., Rome.
Tunzer, John M., Little Falls.
Turner, R. C., Oswego.
Webb, E. R., 415 University Bldg., Syracuse.
Wells, Albert D., Skaneateles.
Wells, I. G., Holland Patent.
White, Edgar R., 718 S. A. & K. Building, Syracuse.
Williams, Edw. B., Utica.
Wright, Geo. L., 202 W. Genesee st., Syracuse.

LIFE MEMBERS.

Cherry, C. E., 621 Univ. Bldg., Syracuse.
Tibbets, F. G., Fayetteville.

Sixth District.

THE annual meeting of the Sixth District Dental Society of the State of New York was held on March 23, 24, and 25, 1916, and the following persons were elected officers for the ensuing year:

President—John B. Howe.
Vice-president—Jas. T. Ivory.
Recording Secretary—H. V. Heiss.
Treasurer—E. L. Pitcher.
Members of Executive Council—C. M. Dunne (regular), Norwich, and H. D. Whitmarsh (alternate), Binghamton.

The following were appointed to serve on the State Society committees: F. A. Ford (Law); W. J. Le Suer (Legislative); F. M. Willis, and H. D. Whitmarsh (Oral Hygiene).

The society has lost through death—E. D. Downs, Owego; E. J. Pritchard, Hancock: L. E. Knapp, Deposit, and John Irwin, Elmira.

Respectfully submitted,

HENRY V. HEISS, *Sec'y.*

ACTIVE MEMBERS.

Anderson, Wm. T., Endicott.
Arbuckle, J. H., Delhi.
Barnes, A. S., Oneonta.
Barnett, John, Elmira.
Barton, W. W., Savings Bank Building, Binghamton.
Bassett, C. G., Sidney.
Baylis, C. F., Oneonta.
Bond, F. Elis, Press Building, Binghamton.
Burdick, G. A., Homer.
Champlin, F. W., Oneida.
Chapman, B. O., Elmira.
Cowan, J. H., Cortland.
Cox, C. W., Horseheads.
Crawford, J. R., Ithaca.
Crowley, A. J., Ithaca.
Cull, H. J., Cazenovia.
Cunningham, H. E., Hobart.
Curtis, Harold A., Waverly.
Darby, F. B., Elmira.
Decker, George M., Owego.
Denike, G. A., Press Building, Binghamton.
Dolan, B., Security Life Bldg., Binghamton.
Dunne, C. M., Norwich.
Faulkner, J. V., Oneida.
Fitch, H. E., Elmira.
Ford, F. A., Cazenovia.
Frisbie, J. D., Andes.
Garling, N. L., Ithaca.
Garvin, F. A., Oneida.
Gill, E. S., Morrisville.
Gillespie, E. R., Court st., Binghamton.
Griswold, G. M., Unadilla.
Haase, F., Jr., Elmira.
Hamilton, H. B., Ithaca.
Hanks, C. S., Oneonta.
Heiss, H. V., 103 Main st., Johnson City.
Howe, F. B., Ithaca.
Howe, J. B., Ithaca.
Ingalls, C. E., Cortland.
Ingalls, L. S., Cortland.
Ivory, Jas. T., Chenango st., Binghamton.
Jenks, F. M., Ithaca.
Johnson, R. A., Bainbridge.
Kelly, J. D., Binghamton.
Kaley, Myrle, Main st., Johnson City.
Kingsley, R. R., Waverly.
Le Suer, W. J., Oneonta.

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McCall, F. W., Binghamton.
Mayor, Wm. E., Owego.
Miller, H. J., New Berlin.
Mills. ——, Waverly.
Mitchell, H. B., Elmira.
Moore, H. A., Elmira.
Needham, A. V., Oneida.
Nelson, E., Waverly.
Noble, J. E., Endicott.
Ogden, J. D., Press Building, Binghamton.
Ogden, Wm. A., Security Bldg., Binghamton.
Peters, A. S., Worcester.
Peterson, H. A., Elmira.
Pitcher, E. L., Cooperstown.
Pritchard, W. H., Newark Valley.
Pulver, Geo. W., Ackerman Building, Binghamton.
Roe, M. N., Owego.
Root, R. T., Main st., Binghamton.
Sears, Claude C., Trumansburg.
Sharp, W. M., Binghamton.
Smith, F. W., Elmira.
Smith, Floyd H., Oneonta.
Smith, Herman L., Trumansburg.
Smith, Julian, Union.
Soden, F. B., Norwich.
Stuart, T. B., Ithaca.
Sturdevant, T. B., Elmira.
Suter, R. B., Elmira.
Tatlock, F. H., Oneonta.
Thompson, C. E., Oxford.
Turner, A. D., Court st., Binghamton.
Turner, H. H., Marathon.
Wells, H. P., Hamilton.
West, J. B., Elmira.
Whitmarsh, H. D., Oak st., Binghamton.
Wilbur, R. A., Elmira.
Willis, F. M., Ithaca.

HONORARY MEMBERS.

Burchill, J. E., Cortland.
Butler, A. S., Pasadena, Cal.
Flaherty, J. V., Chittenango.
Hall, W. H., Binghamton.
Harris, E. W., Pomona, Cal.
Hoysradt, G. W., Ithaca.
Kelley, W. B., Towanda, Pa.
King, H. B., Roxbury.
McCall, J. A., Buffalo.
Newell, J. K., Towanda.
Quintero, J. M., Lyons, France.
Rischell, E. C., Athens, Pa.
Smith, W. W., Montrose, Pa.
Spencer, C. W., Sidney.
Thompson, F. R., Homer.
Watts, Willis E., Lyons, France.

LIFE MEMBER.

Darby, F. B., Elmira.

Seventh District.

THE annual meeting of the Seventh District Dental Society of the State of New York was held April 14 and 15, 1916, and the following persons were elected officers for the ensuing year:

President—John J. Scott, Rochester.
Vice-president—A. Osgood, Bath.
Recording Sec'y—Wirt Conklin, Rochester.
Corresponding Sec'y—C. G. Morsheimer, Rochester.
Treasurer—E. L. Schlottman, Rochester.
State Dental Examiners—W. A. White, Phelps, and J. Edward Line, Rochester (terms to expire 1918).
Members of Executive Council—B. S. Hert (regular), Rochester, and C. L. Brininstool (alternate), Rochester.

The following were appointed to serve on State Society committees: B. W. Palmer (Law); E. G. Link (Legislative); A. W. Smith and W. W. Belcher (Oral Hygiene).

Respectfully submitted,
C. G. MORSHEIMER

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ACTIVE MEMBERS.

Agnew, F. L., 63 Monroe ave., Rochester.
Avery, R. B., Auburn.
Bachman, C. C., Waterloo.
Banks, J. L. E., 407 Dake Bldg., Rochester.
Barr, W. H., 800 Main st. W., Rochester.
Barrett, W. R., Spencerport.
Baylor, Wm., Nunda.
Becker, A. D., Palmyra.
Beebee, J. H., 915 C. of C. Building, Rochester.
Belcher, H. L., Seneca Falls.
Belcher, W. W., 186 Alexander st., Rochester.
Bennett, C. A., 318 Powers Bldg., Rochester.
Bliss, T. C., 102 Main st., Hornell.
Bostwick, W. A., 133 Clinton ave. S., Rochester.
Bradley, M. C., 608 Granite Bldg., Rochester.
Brininstool, C. L., 1103 Granite Building, Rochester.
Brown, H. O., Waterloo.
Bryant, F. E., 309 Jefferson ave., Rochester.
Bryant, S. Roy, 309 Jefferson ave., Rochester.
Buckland, C. F., Corning.
Burkhart, A. P., 52 Genesee st., Auburn.
Burkhart, G. A. P., 121 Genesee st., Auburn.
Burns, C. G., 47 Elwood Building, Rochester.
Cameron, J. H., Caledonia.
Carey, J. H., 115 Union st. N., Rochester.
Chase, C. D., 46 Webster ave., Rochester.
Clapp, E. A., Livonia.
Clark, B. F., 133 Clinton ave. S., Rochester.
Conklin, W. H., 624 Mercantile Building, Rochester.
Conyne, R. J., 1064 Main st. E., Rochester.
Crump, I. J., 20 Triangle Building, Rochester.
Demerath, C. F., 511 E. & B. Bldg., Rochester.
Dengler, F. J., 214 Wilder st., Rochester.
Dunn, J. E., 884 Main st. W., Rochester.
Durrant, J. B., Honeoye Falls.
Eckler, H. F., 306 E. Ave. Bldg., Rochester.
Elmendorf, C., Penn Yan.
Fairfield, H. G., Geneva.
Foley, J. M., 346 Plymouth ave., Rochester.
Fraley, C. J., Geneseo.
Frank, H. L., E. Rochester.
Furner, J. S., Lima.
Gamble, W. D., Wayland.
Gilbert, L. H., 705 E. & B. Bldg., Rochester.
Goble, L. S., 40 Triangle Building, Rochester.
Graves, J. W., 32 Triangle Bldg., Rochester.
Greene, F. A., Geneva.
Griswold, E. R., Dansville.
Griswold, V. H., 102 Weld st., Rochester.
Hall, A., 43 Main st., Hornell.
Hammond, H. E. J., 14 William st., Auburn.
Hanna, J. N., 575 Main st. W., Rochester.
Hert, B. S., 713 C. of C. Building, Rochester.
Hettig, A. F., 227 Cutler Building, Rochester.
Hicks, B. G., Canandaigua.
Hofheinz, R. H., 818 C. of C. Bldg., Rochester.
Holcomb, R. J., 422 Mercantile Building, Rochester.
Horton, F. C., Clyde.
Horton, G. L., 12 Williams st., Auburn.
Horton, H. S., Avoca.
Howland, C. A., 901 C. of C. Bldg., Rochester.
Hughes, Wm., 139 Genesee st., Auburn.
Hulme, M. L., 75 S. Fitzhugh st., Rochester.
Inman, E. R., Clyde.
Ivory, F. W., 57 Triangle Bldg., Rochester.
Kohler, M. W., Fairport.
Kuhn, F. W., Dansville.
La Salle, R. F., 411 Main st. E., Rochester.
Lascell, E. R., Charlotte.
Lewis, E. F., 508 E. & B. Bldg., Rochester.
Line, J. E., 1104 Granite Building, Rochester.
Link, E. G., 226 Cutler Building, Rochester.
Locke, G. E., Brockport.
Lowe, C. C., 813 C. of C. Building, Rochester.
Lynch, C. G., 185 Park ave., Rochester.
McDermott, T. H., 216 Merriman st., Rochester.
McIntee, J. T., 248 Cutler Bldg., Rochester.
McMullen, M. F., 383 Main st. E., Rochester.
Marshall, H. E., Lyons.
Martin, J. F., Newark.
Marvin, G. P., 211 Cutler Bldg., Rochester.
Mattison, J. J., Canandaigua.
Meaker, S. R., Auburn.
Messerschmitt, F., 1023 Granite Building, Rochester.
Meyers, W. A., 124 Genesee st., Auburn.
Middaugh, J. E., Phelps.
Miller, H. S., 18 Sibley Place, Rochester.
Milne, C. C., 3 Lyell ave., Rochester.
Moll, C. F., 1 East ave., Rochester.
Morsheimer, C. G., 133 Clinton ave. S., Rochester.
O'Neil, W. B., 747 Main st. W., Rochester.
Osgood, A., Bath.
Palmer, B. W., 232 Univ. ave., Rochester.
Parish, W. A., Avon.
Parmelee, J. H., 418 Mercantile Building, Rochester.

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Povall, W. H., Mt. Morris.
Proseus, F. W., 270 Monroe ave., Rochester.
Pulver, P. C., 525 Mercantile Bldg., Rochester.
Reeves, H. G., Fairport.
Requa, L., 307 Cutler Building, Rochester.
Rood, F. M., 700 E. & B. Building, Rochester.
Sackett, W. C., 552 Genesee st., Rochester.
Sager, A. E., 624 Mercantile Bldg., Rochester.
Sanford, J. E., 48 James st., Rochester.
Saunders, B. G., 83 East ave., Rochester.
Schake, Sarah M., 711 C. of C. Building, Rochester.
Schlottman, E. L., 809 C. of C. Building, Rochester.
Scott, J. J., 901 C. of C. Building, Rochester.
Sebold, F. C., Auburn.
Shaddock, F. J., 819 C. of C. Bldg., Rochester.
Sharp, E. T., Victor.
Showers, G. F., Corning.
Smith, A. W., 33 Chestnut st., Rochester.
Smith, P. H., 86 Hickory st., Rochester.
Smith, P. W., 913 C. of C. Bldg., Rochester.
Smith, W. W., 83 East ave., Rochester.
Stott, H. B., 433 Mercantile Bldg., Rochester.
Sutherland, L. D., Canandaigua.
Sweet, E. J., 44 Main st., Hornell.
Tarrant, F. J., 837 Main st. W., Rochester.
Thorn, C. A., 702 Clinton ave. N., Rochester.
Tillotson, R. R., Lyons.
Vanderbelt, C. R., 412 Beckley Building, Rochester.
Waldron, C. R., 1129 Granite Building, Rochester.
Wallace, W. R. J., Canandaigua.
Welch, J. W., 40 West ave., Fairport.
Weller, J. L., Jr., 426 Mercantile Building, Rochester.
White, W. A., Phelps.
Windell, W. A., 720 E. & B. Bldg., Rochester.

HONORARY MEMBERS.

Adams, D. F., Minnesota.
Goode, G., New York.
Howard, C. T., Rochester.
Jenkins, N. S., Paris.
Miller, H. S., Rochester.
Nicholson, C. H., Ontario.
Smith, M. H., Colorado Springs.
Walters, J. S., Eugene, Ore.
Ward, C. H., Rochester.
Watson, G. H., Berlin.

LIFE MEMBERS.

Elmendorf, C., Penn Yan.
La Salle, B. F., Rochester.
Line, J. Ed., Rochester.
Miller, H. S., Rochester.
Osgood, A., Bath.
Sanford, J. E., Rochester.
Smith, P. H., Rochester.

Eighth District.

THE annual meeting of the Eighth District Dental Society of the State of New York was held on April 11, 1916, and the following persons were elected officers for the ensuing year:

President—M. B. Eshleman, Buffalo.
Vice-president—L. Mulcahy, Batavia.
Recording Secretary—J. A. Sherwood, Buffalo.
Corresponding Secretary—L. L. Childs, Springville.
Treasurer—F. A. Ballachey, Buffalo.
Librarian—A. F. Isham, Buffalo.
State Dental Examiners—H. J. Burkhart and J. A. Sherwood (term to expire 1918).
Members of Executive Council—Robert Murray (regular), Buffalo, and A. Hoffman (alternate), Buffalo.

The following were appointed to serve on State Society committees: A. E. Mimmack (Law); H. J. Burkhart (Legislative); J. Wright Beach and D. H. Young (Oral Hygiene).

The Eighth District Dental Society held four regular meetings during the year, according to custom, and also a union meeting of the Fifth, Sixth, Seventh, and Eighth districts, held in Syracuse, November 11, 12, and 13, 1915, and a union meeting with the Buffalo Dental Association at the annual

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dinner held Saturday evening January 8, 1916, at the Hotel Statler.

Three of our regular meetings for the year have been held at the University Club, Buffalo, and one meeting at Medina, N. Y. The subjects presented have been of great interest to those present, and the meetings have been well attended. The attendance has ranged from fifty to eighty, including visitors. The union meeting of the Fifth, Sixth, Seventh, and Eighth Districts, held in Syracuse, was attended by about four hundred members from the several districts, and was one of the best meetings ever held in Syracuse. The papers were of exceptional merit, and full of valuable knowledge to the profession. The Eighth District Society was well represented at this meeting.

The union dinner with the Buffalo Dental Association was in charge of the Buffalo Dental Association. The speakers for the evening were Mr. Adelbert Moot, whose talk on "Preparedness" was well received, and Dr. Stephen Palmer, president of the New York State Dental Society.

During the year we have taken in twenty-seven new active members and one honorary member, and have some applications for membership held over for next year. This will bring our membership to two hundred and ten, and shows that the members have been interested and busy during the year in recruiting our membership. We have lost no members this year by death. In going over the records of past years and making a comparison with the present, the Society shows a steady growth toward better and higher achievements for our profession and for those whom we serve.

Respectfully submitted,

J. A. SHERWOOD, *Rec. Sec'y.*

ACTIVE MEMBERS.

Adams, Francis Stone, 21 W. North st., Buffalo.
Allen, Chas. E., Brocton.
Anderson, Chas. E., Jamestown.
Backus, Herman W., 99 Elmwood ave., Buffalo.
Backus, W. M., 475 Grant st., Buffalo.
Baitz, Arthur G., 78 W. Oakwood Place, Buffalo.
Ballachey, F. A., 450 Elmwood ave., Buffalo.
Barclay, H. L., 174 East Ferry st., Buffalo.
Barrows, D. E., Olean.
Bartlett, W. B., Castile.
Bates, O. W., 186 Seneca st., Buffalo.
Beach, J. W., 131 Allen st., Buffalo.
Benson, Stephen S., Belfast.
Beyer, F. A., 599 Main st., Buffalo.
Bode, Armin H., 370 Genesee st., Buffalo.
Boughton, W. E., Batavia.
Brown, Robt., 1865 Niagara st., Buffalo.
Brumberg, Louis, 373 Clinton st., Buffalo.
Buell, C. K., 131 Allen st., Buffalo.
Burkhart, H. J., Batavia.
Burley, W. J., Gowanda.
Burns, E. F., 1375 Main st., Buffalo.
Bush, Wm. W., Rushford.
Butler, C. S., 267 Elmwood ave., Buffalo.
Callahan, Geo. D., 1115 Genesee st., Buffalo.
Carmichael, D. D., Leroy.
Caulkins, C. R., Perry.
Caulkins, R. W., Perry.
Cavers, W. W., 450 Elmwood ave., Buffalo.
Chester, H. M., 51 Park st., Buffalo.
Cleveland, Joseph L., 505 Franklin st., Buffalo.
Childs, Lowell L., Springville.
Christenson, J. C., 106 Falls st., Niagara Falls.
Clements, J. L., 530 W. Utica st., Buffalo.
Clifford, J. F., 62 Main st., Lockport.
Cogan, Maurice J., 359 Connecticut st., Buffalo.
Collins, J. P., 504 Brisbane Bldg., Buffalo.
Collins, John F., 580 Elmwood ave., Buffalo.
Common, John, Andover.
Conforto, Anthony D., 334 Terrace, Buffalo.
Consul, Arthur H., 404 E. Genesee st., Buffalo.
Coon, W. W., Alfred.
Cursons, Leon V., 331½ Franklin st., Buffalo.
Cramer, J. W., Albion.
Crocker, F. M., Perry.
Davis, Charles H., 1425 Main st., Buffalo.
Dayment, F. L., 1 Bloor st. E., Toronto, Can.
Dewey, C. E., Batavia.
Dickson, W. B., 446 Genesee st., Buffalo.
Dillon, Chas. P., Batavia.
Diltz, David A., Warsaw.
Dixon, J. A., 917 Jefferson st., Buffalo.
Dollinger, Raphael H., Albion.

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Doolittle, G. P., Albion.
Downes, C. R., 100 Main st., Lockport.
Dudley, J. R., Olean.
Duncan, J. C., 6 West ave., Lockport.
Early, S. J., Olean.
Edgerly, S. C., 743 Fillmore ave., Buffalo.
Ellis, W. H., 397 Delaware ave., Buffalo.
Ellwood, G. T., 55 Parker ave., Buffalo.
Ernsmere, J. B., 308 W. Ferry st., Buffalo.
Eschelman, S., 421 Franklin st., Buffalo.
Eshleman, M. Burton, 170 Hodge ave., Buffalo.
Farmer, E. J., 265 W. Ferry st., Buffalo.
Fay, M. L., 379 Hudson st., Buffalo.
Fiero, Guy M., 1355 Main st., Buffalo.
Fish, J. B., 759 Tonawanda st., Buffalo.
Flagg, C. E., 158 Anderson Place, Buffalo.
Frank, F. L., 718 Elmwood ave., Buffalo.
Frey, George J., 209 D. S. Morgan Building, Buffalo.
Froeber, Edward George, 462 E. Genesee st., Buffalo.
Garretson, J. L., 200 Hodge ave., Buffalo.
Garrett, F. S., 131 Allen st., Buffalo.
Gemmill, R. A., Lockport.
Geenen, G. J., 221 Hampshire st., Buffalo.
Glazier, L. F., Springville.
Graf, E. G., 706 Michigan ave., Buffalo.
Graf, Katherine M., 252 Broadway, Buffalo.
Gregg, M. A., 103 Genesee st., Buffalo.
Greenfield, W. C., 169 Northland ave., Buffalo.
Gerstman, H. Viola, 755 Seneca st., Buffalo.
Gibbs, A. B., Batavia.
Hale, Charles F., 303 Potomac ave., Buffalo.
Hall, Fred J., 43 W. Tupper st., Buffalo.
Hammersmith, P. C., 25 Indian Church road, Buffalo.
Harper, F. E., Angola.
Havens, F. C., Niagara Falls.
Hawes, Louis C., 1370 Main st., Buffalo.
Heinrich, Albert, 541 Walden ave., Buffalo.
Hicks, J. R., 55 Allen st., Buffalo.
Hicks, T. A., 55 Allen st., Buffalo.
Hickelton, George Taylor, 322 Elk st., Buffalo.
Hill, Frank P., 731 Prospect ave., Buffalo.
Hoffman, A., 529 Franklin st., Buffalo.
House, C. W., Holland.
Hollister, A. H., 13 E. Main st., Fredonia.
Hughey, G. M., 1355 Main st., Buffalo.
Huver, H. B., 100 D. S. Morgan Building, Buffalo.
Isham, A. F., 85 N. Pearl st., Buffalo.
Jackson, Graham E., Franklin and Edward sts., Buffalo.
Jackson, L. E., Franklinville.
Jones, O. E., Wellsville.
Jung, A. H., 64 Goodell st., Buffalo.
Jung, E. P., 584 Genesee st., Buffalo.
Jung, Elmer F., 607 Genesee st., Buffalo.
Kehr, G. B., 242 Forest ave., Buffalo.
Kendall, C. A., 241 Norwood ave., Buffalo.
Kiefer, Leo. G., 700 Broadway, Buffalo.
Klipfel, Charles M., 1350 Fillmore ave., Buffalo.
Kitching, H. W., Hamburg.
Knoche, Elmer J., 5 W. Utica st., Buffalo.
Lahey, Arthur R., 2001 Main st., Niagara Falls.
Landell, C. A., 603 E. Genesee st., Buffalo.
Lay, Victor, 891 Genesee st., Buffalo.
Leake, W. J., 53 Main st., Lockport.
Lee, Francis J. M., 1298 Jefferson st., Buffalo.
Leitze, G. L., 1137 E. Genesee st., Buffalo.
Leland, Lloyd E., 1872 Niagara st., Buffalo.
Levy, Marvin, 1371 Main st., Buffalo.
Lindgren, Lennart J., 980 Elmwood ave., Buffalo.
Lorenz, Geo. W., 66 Goodell st., Buffalo.
Low, F. W., 52 N. Pearl st., Buffalo.
Lugsdin, F. G., 131 Allen st., Buffalo.
McCall, J. O., 131 Allen st., Buffalo.
McCarthy, A. J., 131 Allen st., Buffalo.
McCarthy, James J., Olean.
McCoy, D. H., 899 Main st., Buffalo.
McMichael, H. R., 15 Oxford ave., Buffalo.
MacDougall, S. E., 530 Brisbane Building, Buffalo.
Madden, J. J., 49 Niagara st., Buffalo.
Main, D. T., 337 Niagara st., Buffalo.
Mair, C. R., 1157 Michigan ave., Buffalo.
Mallory, J. P., 463 W. Ferry st., Buffalo.
Marshall, W. E., Box 27, Eden.
Maul, Irving E., 519 Main st. E., Batavia.
Maul, Willis R., 519 Main st. E., Batavia.
Meisburger, L., 85 N. Pearl st., Buffalo.
Mimmack, A. E., 795 Elmwood ave., Buffalo.
Middleton, C. O., 36 Young st., Tonawanda.
Montgomery, W. R., 505 Franklin st., Buffalo.
Morgan, G. H., 2 N. Pearl st., Buffalo.
Mouthrop, G. F., 273 W. Ferry st., Buffalo.
Muir, Robert, 21 Main st., Gowanda.
Mulcahy, L. L., Batavia.
Muntz, E., 867 Washington st., Buffalo.
Murray, Robert, 761 Elmwood ave., Buffalo.

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Newman, T. E., 546 Tonawanda st., Buffalo.
Noyes, W. P., Olean.
O'Shea, Thos. F., Leroy.
Otis, N. L., 678 Main st., Buffalo.
Packwood, E. S., 1370 Main st., Buffalo.
Pankow, C. A., 357 William st., Buffalo.
Parker, R. C., Sycamore and Fillmore aves., Buffalo.
Paxson, G. A., Hamburg.
Prefert, Alfred, 795 Genesee st., Buffalo.
Prentice, W. H., Crossett Block, Warsaw.
Preston, A. E., Delevan.
Prior, Ray Leon, 1115 Genesee st., Buffalo.
Pullen, H. A., 131 Allen st., Buffalo.
Raub, Herbert D., Olean.
Read, E. M., Perry.
Read, Harry S., Delevan.
Reynolds, H. E., 577 Broadway, Buffalo.
Roberts, J. G., 174 E. Ferry st., Buffalo.
Robinson, L. W., 129 Elmwood ave., Buffalo.
Rozan, George O., 1070 Broadway, Buffalo.
Ruszaj, S. E., 1012 Broadway, Buffalo.
Ryerse, O. G., 727 Seneca st., Buffalo.
Sandman, R. J., 24 Glendale Place, Buffalo.
Schwartz, Edward, 1234 Fillmore ave., Buffalo.
Sharp, C. H., 73 Main st., Lockport.
Sherwood, J. A., 283 Bryant st., Buffalo.
Sherlock, T. F., Lockport.
Schnitzapahn, E. E., 18 St. Johns Place, Buffalo.
Simonds, G. H., 106 Pearl st., Medina.
Skinner, O. M., 968 Ridge road, Lackawanna.
Speidel, Immanuel G., 509 William st., Buffalo.
Spillman, Josephine H., 64 Webster st., N. Tonawanda.
Sortore, J. F., Belmont.
Stackhouse, J. A., 186 Allen st., Buffalo.
Steigerwald, C. C., 564 William st., Buffalo.
Stiker, A. G., Addison.
Storms, C. L., 153 E. Utica st., Buffalo.
Squire, D. H., 488 Franklin st., Buffalo.
Squires, L. A., 2337 Main st., Buffalo.
Sugnet, Edward L., 537 William st., Buffalo.
Tanner, H. F., Medina.
Tench, J. M., 1353 Jefferson st., Buffalo.
Tench, R. W., 220 42d st. W., New York.
Tesch, Frederick C., 69 Gluck Building. Niagara Falls.
Thompson, D. M., 311 Hartshorn Building, Niagara Falls.
Todd, E. L., Stearns Building, Dunkirk.
Underwood, F. H., 1063 Ellicott st., Buffalo.
Valente, Victor, 118 Seventh st., Buffalo.
Wagner, W. J. A., Sherman.
Wardner, J. F., Lackawanna.
Warner, C. A., 39 S. Niagara st., Tonawanda.
Washburn, F. M., Perry.
Weaver, F. C., 6 West ave., Lockport.
Whipple, B. W., 301 Union st., Olean.
Whipple, E. O., 301 Union st., Olean.
Whipple, H. L., Cuba.
Wiles, L. E., Fillmore.
Wilmot, Max D., 488 Franklin st., Buffalo.
Wolfsohn, Myron D., 165 William st., Buffalo.
Woodbury, Edward W., 21 W. North st., Buffalo.
Woodley, F. E., 123 Falls st., Niagara Falls.
Young, D. H., Attica.

HONORARY MEMBER.

Hiland, L. Benjamin, 33 Center st., Batavia.

LIFE MEMBERS.

Lewis, T. G., Buffalo.
Snow, G. B., Long Beach, Cal.

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Ninth District.

THE annual meeting of the Ninth District Dental Society of the State of New York was held April 14, 1916, and the following persons were elected officers for the ensuing year:

President—A. W. Twiggar, Ossining.
Vice-president—D. W. McLean, Mt. Vernon.
Recording Secretary—C. D. Gurnee, Beacon.
Corresponding Secretary—C. W. Morris, Central Valley.
Treasurer—L. W. Helms, Peekskill.
Librarian—F. Smith, Newburgh.
State Dental Examiners—H. C. Bennett (to fill unexpired term) and D. W. McLean (to fill unexpired term.)

The following were appointed to serve on State Society committees: J. E. Patterson (Law); H. C. McBrair (Legislative); W. V. Randall and Bertram Ball (Oral Hygiene).

The Ninth District Dental Society, through its recording secretary, wishes to report to the Dental Society of the State of New York that four meetings have been held during the past year, two in Newburgh at the Palatine Hotel and two in Yonkers at the Park Hill Inn—Oct. 8, 1915, Dec. 15, 1915, Feb. 11, 1916, and April 14, 1916.

Nine new members have joined the society—Drs. Nichols, Peterson, Mahoney, Ernst, Burr, Bugden, Segal, Rosen, and Weiss. The society has lost by death Dr. Fred Sweezy of Port Jervis, N. Y. There are now eighty-one active members.

The society contributed to the National Research Committee $100, for which a check was sent; individual subscriptions to the amount of $30—total $130.

A number of clinics were given before the society and several papers were read.

Respectfully submitted,
WM. M. STANBROUGH, *Rec. Sec'y.*

ACTIVE MEMBERS.

Allen, E. J., Port Chester.
Anderson, A. E., Peekskill.
Ashplant, P. R., 43 Montgomery st., Newburgh.
Ball, Bertram, Yonkers.
Bannan, P. C., 95 Water st., Newburgh.
Barnum, H. L., 40 Second st., Newburgh.
Bauder, P., 32 Water st., Newburgh.
Bedell, A. P., Mt. Vernon.
Bedell, W. H., Poughkeepsie.
Bennett, H. C., 75 Water st., Newburgh.
Bugden, F. C., New Rochelle.
Burr, J. C., Port Jervis.
Carr, Lewis H., 47 Second st., Newburgh.
Chatterton, J. W., Poughkeepsie
Clark, R. L., Mt. Vernon.
Cole, J. P., Dobbs Ferry.
Conover, C. H., 53 Water st., Newburgh.
Cowles, E., Beacon.
Darrow, H. N., Mt. Vernon.
DeWitt, H. S., Middletown.
Downing, V. F., Poughkeepsie.
Dunning, W. O., Middletown.
Duryee, E. C., Peekskill.
Ehleider, T. J., Poughkeepsie.
Erman, E. P., Warwick.
Ernst, Otto, Larchmont.
Fancher, W. E., Yonkers.
Fancher, W. M., Ossining.
Fisher, W. C., Bronxville.
Foote, P. L., Poughkeepsie.
Frachtman, Philip, Suffern.
Franzius, G. H., Bronxville.
Granger, A. L., Mt. Vernon.
Green, R. B., Tarrytown.
Gurnee, C. D., Beacon.
Hammond, G. A., Port Jervis.
Helms, L. W., Peekskill.
Hepworth, J. T., Wappingers Falls.
Johnson, J. H., Port Jervis.
Kidd, W., Newburgh.
Knapp, W. A., Millerton.
Lansing, C. T., Yonkers.
McLean, D. W., Mt. Vernon.
McBrair, H. C., Middletown.
MacElroy, Marie, Mt. Vernon.
Mahoney, W. P., Millbrook.
Marrow, Robt., Nyack.
Massoth, H. P., New Rochelle.
Mills, J. J., Port Jervis.
Morris, Geo. W., Central Valley.
Nichols, Guy L., Ossining.
Northup, G. A., Poughkeepsie.
Palmer, Stephen, Poughkeepsie.

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Parker, E. G., Goshen, N. Y.
Patterson, J. E., Poughkeepsie.
Peterson, Leslie C., Croton-on-Hudson.
Phin, A. E., Peekskill.
Randall, W. V., 78 Water st., Newburgh.
Rosen, Harry, Yonkers.
Ryder, H. L. B., Poughkeepsie.
Segal, Peter, New Rochelle.
Smith, Fred, 25 Water st., Newburgh.
Swift, T. C., Mt. Vernon.
Southerland, J. R., Monroe.
Stanbrough, Wm. M., 51 Colden st., Newburgh.
Suffern, E. R., Suffern.
Sweezy, F. W., Port Jervis.
Thompson, C. H., Goshen.
Tice, C. H., Middletown.
Turner, C. G., Poughkeepsie.
Traver, W. E., Red Hook.
Twiggar, A. W., Ossining.
Ulsaver, E. S., New Rochelle.
Vail, C. T., Yonkers.
Varcoe, E. R., Goshen.
Vernon, G. H., Middletown.
Weiss, Joseph, Ossining.
Writer, G. S., Nyack.
Wygant, G. P., Peekskill.

HONORARY MEMBER.

Hutchinson, R. G., Jr., New York City.

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President's Address.

By STEPHEN PALMER, D.D.S., Poughkeepsie.

MEMBERS OF THE DENTAL SOCIETY OF THE STATE OF NEW YORK, GUESTS AND FRIENDS,—

Forty-eight years ago a few men of our chosen profession realized the necessity of organization, that in union and that only could dentistry be advanced; forty-seven years passed, and it became my good fortune, through your good-will, to be chosen to pilot this society through a year. Accept my thanks for the honor thus bestowed upon me, and although at times during the year I have been discouraged, it has not been for long, owing to the loyalty of the members, and the faithfulness of those serving on committees, to whom must be given much credit for the smoothness of the year's voyage, the final safe harbor, and glorious landing, as exemplified in this our annual meeting.

Dentistry of today is showing the results of the energies of those men who, nearly a half-century ago, realizing that no one man knew it all, and desirous of meeting together and exchanging ideas, organized this society. Today sixteen hundred of us are endeavoring to assist one another to solve our daily problems. We are organized as a solid body, extending over the Empire State from north to south and east to west, striving to immortalize the efforts of that small body of courageous men, and it behooves us to set a pace for the coming generation that they may look back upon with pride, as dentistry of this the twentieth century is rapidly coming into fame, and is being recognized by all as one of the great professions.

THE DEMANDS OF THE FUTURE.

Today we find the medical profession and the educators calling, "'Come over and help us.' Help us to solve the problem of the origin of many bodily ailments; help us to improve the health of our boys and girls, that the coming men and women may be healthier, stronger, and bigger, and thus better able to cope with the problems of the times; help us to clear the minds of the children, that the knowledge we are imparting to them may take root." In all these efforts we can assist if we will. Will we do it? Every member of our profession will be called to account if we do not stand ready and willing to assist in these great tasks, and only by enthusiastic co-operation can dentistry take the place we wish it to occupy among the learned professions.

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Listen to the aim of a profession as given by President Faunce of Brown University:

> Trade is an occupation for a livelihood; profession is an occupation for the service of the world. Trade is an occupation often taken up temporarily until something better offers; profession is an occupation with which one is identified for life. Trade makes one the rival of every other trade; profession makes one a co-operator with all his colleagues. Trade knows only the ethics of success; profession is bound by lasting ties of sacred honor.

"Identified for life; co-operator with our colleagues; bound by lasting ties of sacred honor."—Do all of us measure up to this standard? Are we as members of the profession of dentistry proving by our daily lives that we are "bound by lasting ties of sacred honor to our profession?" If not, let us from this day pledge ourselves.

THE DISTRICT SOCIETIES.

As president of the society it is one's duty to visit the nine affiliated district societies. This I have done either in union, in special, or in regular meeting, and in addition to this I have visited many county and city society meetings. It is sufficient at this time to say that all the districts were found to be in good condition, membership increasing, and the quality of the meetings improving. My only suggestions would be, to those districts including in their territory several counties, which makes journeying to meetings a hardship to many, that they devise some plan for holding sectional meetings, where the officers of the district should be in attendance. By that plan I believe many members could be added to our list, and soon men would realize that they could not afford to stay away from the district and state meetings. Also it is noted with regret the lack, and in many cases almost the entire absence, of local talent used at district meetings, this being crowded out by talent brought from distant districts or states. Why should this be, when we often note among the members the men sought by other societies as essayists? I believe this is a mistake, as a district society which lives up to its duty should be a training-school for higher service in the state and national societies. The districts that first realize this will be the ones to advance in activity and efficiency.

One does not learn the real perplexities of a society and its needs until made its head, and thus meets with obstacles before unknown to him. It is another duty of a president to note the conditions and suggest some plan for improvement.

ADVANCE IN DUES.

Whenever an advance is made in any way in our life, in our practice, or in our society, we all know from experience that it brings forward the question of finances, yet one always notes that no one regrets the passing of cash so long as value is received. The necessity for more funds was realized by our Executive Council if there was to be advance in service, therefore they asked for an advance in dues, and called upon the president to assist in the cause. It can be said with credit to the members that practically little objection has been made, and thus hereafter the work of progress may go on unobstructed.

INDEPENDENT JOURNALISM.

Independent journalism was an issue at the beginning of this year, and seemed

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assured after its favorable reception in the fall by our districts, but alas it died a quiet and peaceful death before the New Year: however, a favorable undercurrent is noted if one watches closely. I suggest that the president for the coming year be empowered to appoint a committee to publish a journal for 1918 at least, to commemorate our fiftieth anniversary; that it be a journal of at least two issues, one in the early months of the year and one at the time of the meeting, and let it be of such a quality that it will be cherished by the members, and thus create a demand for its continuance.

FIFTIETH ANNIVERSARY OF THE SOCIETY.

Our fiftieth anniversary as noted is near at hand. It is already decided to hold this meeting in New York City, also that every member should work to make it a celebration to be remembered, and it is also decided that it will be the crowning glory of our society. I would recommend that the president-elect appoint committees immediately to take up the work without delay. I would also suggest that this anniversary meeting be strictly professional, educational, and scientific in character. Let us take advantage of this occasion to not only show to the world the advance of dentistry in the past half-century, but also to convince them that the dental profession has a glorious future.

As this anniversary meeting will be one of the best, attracting many dentists and their wives from other states, I would recommend that a banquet be arranged for one evening, and that the ladies be invited as our guests, thus showing our love and respect to the helpmates of us all.

As unto the bow the cord is,
So unto man is woman;
Though she bends him, she obeys him,
Though she draws him, still she follows.
As a bow without a quiver,
Useless each without the other.

EXHIBITS.

It is becoming more and more difficult to arrange for the exhibits at our meeting. May we not take this as a "sign of the times," and ask this question, Is it necessary to have exhibits to attract members to our meeting? I would recommend that hereafter our society conduct only its scientific section, educational exhibits, and clinics, and that the manufacturers be at liberty to conduct their own exhibits where and as they are inclined.

RESEARCH WORK.

Our Research Committee has accomplished much, as will be noted in the report before the meeting closes. But ought not we to put still more energy and money into this branch of our activities? Nothing will place our state and our society in so pleasant and brilliant a position as will this work. There is nothing we need more in this day than enlightenment on many problems, and it is the research work of our society combined with that of our National Association that will finally guide us in our work. As president I bespeak my deep appreciation for the untiring activities of our Scientific Research Committee, and commend to all the members their financial support of the great work of the National Research Commission. Professionally we would be benefited by postgraduate classes being formed in all our districts, thus inspiring our members to more diligent study.

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PUBLIC DENTAL EDUCATION.

Public education through the activity of Dr. Howe, of the state Education department, is rapidly gaining foothold. The day is speedily coming when we as members of our profession must stand ready to assist in this work, and go out among the people and explain to them the things that we know to be true and which they now are anxious to hear from one who knows. The time is at hand, fellow members, when we as a society should request the state Educational department to select a dental adviser to confer with them on all questions relating to Oral Hygiene, and I would recommend that such a request be made. I would also recommend that Dr. W. A. Howe, medical examiner of the state Educational department, in recognition of his untiring efforts in behalf of dental education in the department, be elected an honorary member of our society.

THE ORAL HYGIENE PROPAGANDA.

Oral Hygiene, under the guidance of an energetic committee, has made many advances during the year; lectures have been given in many of the state normal schools, and the moving picture film, Oral Health, has been exhibited in many cities.

THE NEW DENTAL LAW.

At last we have succeeded in passing a law which we believe will revolutionize dentistry in our state, forbidding the incorporating of dental companies, ridding our state of illegal practitioners, and legalizing dental hygienists. Our Special Legislative Committee and the Law Committee are to be commended and thanked for their faithfulness in behalf of improved conditions.

NATIONAL RELIEF FUND.

The National Relief Committee of the National Association is now thoroughly organized, our society having its representatives on this committee, and it is hoped that any requests from our committeemen will meet with the approval of the committee.

It has seemed advisable to set aside a few hours for exhibitors, at which time the scientific section of our meeting will be closed, and it is requested that all members give the exhibitors the attention and courtesy they deserve at that time.

I would recommend that an invitation be extended to the National Dental Association to hold their session of 1917 in the city of New York, and that as our state has not been honored with the national presidency for nine years, it would be very appropriate for New York to again have the honor at that time.

Our state is to be congratulated upon the founding within its borders of a Dental Dispensary by Mr. George Eastman of Rochester. The National Association has seen fit to recommend a tablet to Mr. Eastman for his generosity, and I would recommend that our State Society appropriate a substantial sum toward such a tablet.

DEATH OF DR. G. V. BLACK.

We have been viewing the pleasant and progressive side of our state work, and I regret to be obliged to turn your thought to the sadness caused by the passing of some of our members, which will be noted more fully in the report of the Necrology Committee. It is proper, however, that we here call to your attention the death of one of our fellowship members, Dr. Black. "Let us as a pro-

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fession ever delight to honor the men upon whose faith, courage, and achievement rests the superstructure of modern dentistry." We are proud to mention Dr. Black as one of our honored members, and as we are at this time reminded of his useful and wonderful achievements, and his love and loyalty for his chosen profession, may we one and all take his life as our guide:

While the races of mankind endure,
Let his great example stand
Colossal—seen of every land—
And make the soldier firm,
The statesman pure,
Till in all lands, and through all human story,
The path of duty be the way to glory;
And in the great cathedral leave him;
God accept him! Christ receive him.

A gentleman passing the Canadian Parliament building during its construction decided to inquire of some of the laborors the nature of their tasks.

Stepping up to one who was chiseling a piece of granite he asked, "What are you doing? The answer was, "I am earning my daily wage." Not satisfied he asked another, "May I ask what your task is?" The chiseler replied, "Cutting this stone according to the directions on the print." Still not satisfied he walked on to where another laborer was busily engaged at his task, and looking down at him, said, "May I ask what you are doing?" The man pointing up at the partly constructed building replied, "I am helping to create that."

What a motto for every member of our society to take as his, not working because of pay, or because some plan lies before him to follow, but rather helping to create a standing for our profession and a future for mankind that will stand forever.

In closing, just a word of thanks to the essayists, clinicians, and discussers, who have so willingly traveled miles to add to the quality of our meeting. Your labors will bear fruit. We extend to you all the privileges and courtesies of the society, and bespeak for you a pleasant sojourn among us. Friends from other states are welcome always; mingle with us, ask questions, and when departing take with you the memory of our association and friendship. Again a word of thanks and deep appreciation to all the members of our society who have served on committees, and have labored for the success of this meeting. Every man has worked faithfully, and has responded to every call, and in closing I again wish to thank you.

"He who is false to present duty breaks a thread in the loom, and will see the effect when the weaving of a lifetime is unraveled." By your faithfulness to present duties the unraveling of the weavings of this year's labors will reveal no broken thread.

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Report of the Correspondent.

By L. M. WAUGH, D.D.S., New York.

Normal Occlusion: Its Influence upon the Integrity of the Supporting Structures of the Teeth.

YOUR Correspondent has sought further opinion in a collateral phase of the subject dealt with in the report of last year. It is understood that the general subject of "occlusion" is much too broad to be covered in a single report, therefore what is now offered will be recognized as a sequel to that of one year ago. To this end the mailing list was increased by some fifty names, consisting of members of the profession who had shown interest in advanced methods of practice, together with those of instructors in the colleges constituting the membership of the American Institute of Dental Teachers, in the departments of operative dentistry, prosthetic dentistry, crown and bridge work, oral and special pathology, and orthodontia. This embraced approximately 300 practitioners, to each of whom the following circular letter with list of questions was sent:

My dear Doctor,—You have again been selected by the Correspondent of the Dental Society of the State of New York as one of the leading minds from whom it is desirable to obtain an expression of opinion for the report this year.

Answers were received, last year, from 141 dentists, practicing in twenty-two states and in four provinces of Canada. Of these, 100 were teachers in 41 different dental schools, and 41 were from practitioners not members of dental faculties. The report appeared in the August 1915 issue of the *Dental Cosmos*. This year about fifty names of men who were thought to be specially interested have been added.

Some of the officers of the society approved of a further consideration of last year's subject, therefore "Normal Occlusion: Its Influence upon the Integrity of the Supporting Structures of the Teeth" was selected for consideration.

The questions may again seem very simple, but from dental literature, and especially from opinions expressed in discussions, there is proof that there are many who have not recognized the essential importance of normal occlusion for the health and efficiency of the mouth and teeth. Therefore your answers, tabulated with those of others, will greatly aid the Correspondent in his humble effort.

Rest assured of the appreciation of the society and of the personal gratitude of the Correspondent.

Gratefully yours,

L. M. WAUGH, *Correspondent.*

QUESTIONS.

(1) Do you recognize a constant gradual change as taking place in the *supporting structures* of the teeth with advancing age? (As by wearing of contacts and occlusal surfaces, faulty restorations, etc.)

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(2) Do you believe this to be at the minimum when the teeth are in normal occlusion, and that it is aggravated in proportion to the degree of malocclusion?

(3) Do you recognize a more or less constant shifting of teeth that are robbed of their proximal supports—as, for example, by extraction?

(4) How soon do you believe this shifting begins, in adult life, after the loss of an adjoining tooth?

(5) Do you think it best to *immediately* provide means for retaining the space between teeth caused by the loss of a tooth?

(6) Do you recognize an adverse influence upon occlusion in parts *remote from the immediate area* from which a tooth has been lost and a substitute not properly provided?

(7) Do you believe that a gradual structural change in the supporting tissues is brought about by this shifting of position?

(8) Do you believe that the integrity of the alveolus and pericementum is reduced by this gradual minute structural readjustment when long continued?

(9) Do you consider the *normal individual movement* of a tooth essential to its best health and efficiency?

(10) Do you believe that an alveolar support is built wherever the tooth erupts?

(11) When teeth are permitted to fully erupt in malposition, do you recognize that this primary alveolus has to be resorbed as the tooth is moved into normal position, and a new or secondary alveolar support formed?

(12) As a principle, do you believe it best to provide for the retaining of the primary alveolus by *guiding* the tooth having a tendency to malposition to its normal place early in its eruptive period?

Answers to the questions were received from 153 dentists, practicing in twenty-four states and in four provinces of Canada. Of these, 88 were from teachers in forty-four of the dental schools of the American Institute of Dental Teachers, and 65 from practitioners not associated with dental faculties. This, it would seem, should be accepted as quite a representative expression.

The answers were carefully tabulated, and constitute the summary from which the conclusions of this report were drawn. It was the earnest aim to eliminate all personal bias and to base the report wholly upon the opinions expressed in the replies. To this end both negative and affirmative comments are quoted, the conclusions being arrived at by a consideration of all the answers received.

Summary of Answers, with Conclusions.

Question 1.

Do you recognize a constant gradual change as taking place in the SUPPORTING STRUCTURES *of the teeth with advancing age? (As by wearing of contacts and occlusal surfaces, faulty restorations, etc.)*

"Yes," answered by 153. "No," answered by no one.

QUOTATIONS FROM ANSWERS.

S. E. Davenport: "Yes, constant, but in some cases not gradual."

A. W. Thornton: "Yes. The 'etc.' covers a wide field of causes."

P. R. Stillman: "Yes. Evidence of the atrophy of the periodontic structures may be observed in all who have reached the age of forty years."

W. H. Pearson: "Yes, and I think in 90 per cent. of cases it is due to poor dentistry."

C. E. Woodbury: "The greatest change comes from resorption due to advancing years and such changes in the teeth themselves as limit the full use of the teeth. It is a matter of obtaining the full function of the teeth."

H. T. Vaughan: "Yes, especially when the occlusal planes produce lateral motion of the roots, instead of gliding over each other."

E. A. Bogue: "Certainly."

F. R. Getz: "Yes, but I believe also that some of this is normal to the individual; that there is a normal gum recession, even resorption and weakening of the retentive tissues, that is comparable to age changes, as noted in the skin, nails, hair, eyes, and other organs of the human body. This occurs earlier in the life-history of some individuals, later in others."

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H. L. Wheeler: "Yes, not always apparent."

O. J. Gross: "There is continual change as long as life exists."

H. C. Miller: "Only when the occlusion changes."

F. R. Henshaw: "Such change is almost invariably of consequence."

W. H. O. McGehee: "Average length of the arch is 5 inches; it becomes reduced one-third inch, as an average, at forty years of age."

W. T. Stark: "Yes, from birth to death—always from age, frequently from faulty restorations."

Conclusions: (*a*) A constant change takes place in the supporting structures of the teeth with the advance of age. (*b*) This is usually gradual, but may at periods make comparatively rapid progress as a result of either local or general causes.

Question 2.

Do you believe this to be at the minimum when the teeth are in normal occlusion, and that it is aggravated in proportion to the degree of malocclusion?

"Yes," answered by 149. "No," answered by 1. Answer evaded by 3.

QUOTATIONS FROM ANSWERS.

A. W. Thornton: "Yes, the greater the degree of malocclusion the wider the field covered by the 'etc.' in Q. 1."

J. J. Sarrazin: "No, except that normally placed roots have better circulation between them."

C. E. Woodbury: "Yes, on account of ability or failure to obtain full use."

G. W. Dittmar: "Yes, the supporting structures remain normal when there is normal occlusion, normal contact points, and no irritating substance like calculus."

F. F. Fletcher: "Theoretically, yes, but there are exceptions. Have seen supporting structures practically gone, in normal occlusion, at an age between twenty and forty years."

F. C. Rodgers: "Yes, the condition is progressive in malocclusion."

H. W. Morgan: "Not if the patient is a constant chewer of tobacco. In rotated teeth with absent contact the change is very marked."

Martin Dewey: "When in normal occlusion we have normal wear."

W. P. Dickinson: "Surely."

F. W. MacDonald: "Normal occlusion is the great factor in preventing these changes, but even normal relations do not fully prevent."

F. A. Delabarre: "Yes; well stated."

A. S. Walker: "Yes, but not necessarily aggravated in proportion to the degree of malocclusion."

J. W. Beach: "Yes, excepting in those cases where temperament makes edge-to-edge contact a normal condition."

C. O. Simpson: "I believe it is at the minimum in normal occlusion, but not always in the direct ratio to the degree of malocclusion."

Gillette Hayden: "To first half of question, Yes; to second half, Not always."

Conclusions: (*a*) The change that constantly takes place in the supporting structures of the teeth is at the minimum when the teeth are in normal occlusion and in proper use. (*b*) This change is, *as a rule,* aggravated in proportion to the degree of malocclusion.

Question 3.

Do you recognize a more or less constant shifting of teeth that are robbed of their proximal supports—as, for example, by extraction?

"Yes," answered by 146. "No," not answered by anyone. Answer evaded by 7.

QUOTATIONS FROM ANSWERS.

F. R. Getz: "Yes, in varying degree not alone the teeth change, but entire sections or areas of the maxillæ."

S. E. Davenport: "After extraction, teeth change their positions in the effort to secure lateral contact. Once that is secured, they are likely to 'stay put' unless disturbed by disease of the socket."

W. H. Pearson: "Yes, and as a result of not building proximal fillings of proper form from an anatomic standpoint."

H. E. S. Chayes: "Yes, except in people in whom pituitary, thyroid, gonads, and adrenals worked in harmony."

W. W. Smith: "Yes, unless prevented by normal occlusion."

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H. L. Wheeler: "Usually, not always."

H. W. Morgan: "Most certainly; is less objectionable in the case of the permanent first molar if extracted before the eleventh year."

F. W. MacDonald: "Drifting and tipping."

H. E. Friesell: "Occasionally to distal, always to mesial when anterior approximating tooth is lost."

G. R. Spalding: "Yes, if not locked by occlusion."

Conclusion: There is *always* a more or less constant shifting and usually tipping of teeth that are permanently robbed of their normal proximal support.

Question 4.

How soon do you believe this shifting begins, in adult life, after the loss of an adjoining tooth?

"Immediately," answered by 68. "Immediately, unless prevented by locking of teeth," answered by 37. "Almost immediately," answered by 28. Answer evaded by 20.

QUOTATIONS FROM ANSWERS.

C. N. Johnson: "Usually at once."

J. H. Kennerly: "Almost as soon as the tooth is extracted—movement begins while it has only the resistance of the septum."

R. H. Hofheinz: "Practically at once after the loss of an adjoining tooth, especially where cusp is short."

J. O. Taylor: "As soon as absorption of the process begins."

E. A. Bogue: "As soon as the support of antagonizing teeth fails."

C. M. Gearhart: "Concomitant with extraction."

J. L. Young: "As soon as the healing process begins."

Ellison Hillyer: "Very soon. In different positions it will vary."

A. R. Starr: "Right away, except perhaps in rare cases where occlusion has been perfect and the teeth locked to prevent movement."

M. L. Rhein: "Depends on articulation of adjoining teeth. Frequently it commences at once."

H. W. Gillett: "Depends on the condition of the case. Occlusion and condition of the supporting tissues play an important part."

H. A. Pullen: "Immediately, but gradually."

W. H. Pearson: "At once, unless the teeth have very prominent cusps and are in normal occlusion."

H. E. S. Chayes: "Immediately except in people in whom the pituitary, thyroids, gonads, and adrenals worked in harmony."

C. B. Addie: "As soon as bony deposition ceases, and maybe before."

W. W. Smith: "This depends upon the structure of the bone and alveolus and the occlusion."

C. A. Sayers: "Immediately to a certain degree, as one of the forces of occlusion for proximal contact, it is thrown out of balance."

W. P. Dickinson: "If supporting structures are normal and the occlusion made normal, there will be no drifting."

H. C. Miller: "If occlusion is good and supporting structures normal, it may not occur."

F. C. Henshaw: "Usually after a variable period, determined largely by the general integrity and vitality of the tissues concerned."

R. Summa: "Immediately, but extent and rapidity of drifting depend upon occlusion of remaining teeth and vitality of individual."

J. P. Ruyl: "Immediately, unless the opposing teeth be in normal occlusion."

S. Palmer: "Almost immediately in many cases."

J. B. West: "I believe the contact is lost within a few days."

W. H. Ellis: "At once, the degree depending upon age of patient, tone of tissue, and balance of force."

R. Ottolengui: "This would depend upon age of patient at time of loss, and very largely on the length of the cusps and perfection of interdigitation of the adjacent teeth."

L. W. Bake: "At once after extraction."

W. D. Tracy: "Depends on nature of occlusion, but usually by time socket is filled."

J. G. Lane: "At any age, as soon as tooth is lost."

H. E. Kelsey: "Probably right away, though it may not be noted for some time, depending on the efficiency of the interlocking cusps."

W. J. Brady: "In about ten minutes."

D. E. Morrow: "In some mouths almost immediately, but it always begins."

J. J. Sarrazin: "Often never; depends on blood supply."

H. T. Smith and C. H. Stricker: "Histologically, immediately. Practically, observable between six months and five years."

S. W. Allen: "As soon as the inclined planes

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to the mesial and distal of occluding teeth cusps will not prevent it."

Conclusions: (*a*) Shifting in some degree almost invariably begins coincidently with loss of an adjoining tooth unless prevented by artificial means. (*b*) The extent and rapidity will be influenced by normal interdigitation and depth of cusps, the age, and the integrity of the supporting structures, but it will eventually occur, and will be mostly in proportion as the support of antagonizing teeth fails.

Question 5.

Do you think it best to IMMEDIATELY *provide means for retaining the space between teeth caused by the loss of a tooth?*

"Yes," answered by 124. "Yes, unless for special reason," answered by 16. "No," answered by 2. Answer evaded by 11.

QUOTATIONS FROM ANSWERS.

J. H. Kennerly: "Retention of position should be the first consideration after extraction of a tooth."

R. H. Hofheinz: "I believe in immediate provision for retaining space."

A. E. Webster: "Yes, even before the extraction is made."

F. R. Getz: "Yes; reasonably short time afterward, the resorption of the alveolar bone should have practically ceased."

G. W. Dittmar: "As a rule, yes. To prevent drifting of the teeth, proximating the space, and elongating of the occluding tooth or teeth, which would spoil normal contact of the teeth in the opposing maxilla."

J. B. West: "Yes, if we wish to absolutely preserve the contact point of the adjoining teeth."

H. W. Morgan: "Yes, if the patient is twenty or more years of age."

C. N. Johnson: "Theoretically this space should be maintained as soon as the tooth is lost, but there are cases where the teeth are sound on each side of the space, in which a procedure which involved cutting into these teeth would seem radical. It would always be a question as to the necessities of the particular case."

E. Hillyer: "Yes, as soon as compatible with healing, etc."

H. W. Gillett: "In principle, yes. In practice, am influenced by the occlusion and the condition of supporting tissues."

A. W. Thornton: "No, the necessary mutilation of good teeth utilized for retaining appliances might prove the greater evil."

C. B. Addie: "Yes, dependent upon the tooth lost. If previous occlusion was normal, as soon as socket will allow."

H. L. Wheeler: "Not in all cases."

F. L. Rodgers: "Yes; failure to do this constitutes negligence."

O. J. Gross: "It is surely best to maintain normal occlusion."

F. K. Henshaw: "By all means."

A. H. Merritt: "Not as a rule. In many cases impracticable."

C. C. Linton: "Yes, if teeth are in occlusion."

J. G. Lane: "Yes, unless the occlusion is such an interlocking or interdigitating one that infraction cannot occur."

W. J. Brady: "Emphatically, yes!"

D. M. Cattell: "To prevent drifting, best not start it."

Conclusion: As a principle for best practice, it is essential that means be immediately provided for retaining the space between teeth caused by the loss of a tooth except when the natural teeth are to be moved bodily to close the space.

Question 6.

Do you recognize an adverse influence upon occlusion in parts REMOTE FROM THE IMMEDIATE AREA *from which a tooth has been lost and a substitute not properly provided?*

"Yes," answered by 142. "No," answered by 1. Answers evaded by 10.

QUOTATIONS FROM ANSWERS.

S. E. Davenport: "Often the loss of one cog will disturb the retention of a dental outfit. Those who make study casts frequently note this."

H. W. Morgan: "Have seen two cases where the loss of a molar has opened up the interproximal space between the centrals."

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J. L. Young: "Yes, unless the teeth distal to the one removed are moved forward in an upright position."

W. J. Brady: "Most emphatically, yes! Wish I could state it more strongly."

D. M. Cattell: "If one tooth drifts, the next follows suit unless hindered."

G. Goode: "Yes; failure to recognize and properly treat such conditions results disastrously."

M. L. Rhein: "Positively."

E. S. Butler: "Yes, the integrity of the arches is broken and there is a general collapsing of the whole arch."

S. J. Lewis: "I most certainly do."

T. P. McNulty: "Yes, very frequently. Have in mind a patient whose beauty was marred and entire occlusion disturbed by the loss of one lower first molar."

W. E. Farris: "Yes, and have been bothered by it for years."

O. J. Gross: "Every tooth in a mouth may be affected."

H. C. Miller: "Yes, in young subjects."

F. R. Henshaw: "Any interference with normal occlusion affects the entire arch."

C. W. Rubsam: "Decidedly so. Often the influence is seen on opposite side of the jaw by drifting."

A. R. Cooke: "Not unless the loss of teeth is in the arch. The loss of wisdom teeth makes no change."

J. P. Ruyl: "Yes, although often not perceptible for a number of years."

A. H. Merritt: "Not in all cases. May occur, doubtless does in some."

W. D. Tracy: "More often than not."

F. W. MacDonald: "In younger patients the results are very apparent throughout, not on the arch of which it is a part, but in its reacting influence on the opposite arch."

O. A. Weiss: "Yes; very decided sometimes."

B. H. Smith: "Liable to affect the whole denture."

J. M. Hughes: "Yes; I speak from personal experience."

A. S. Walker: "Yes; for example, the loss of an inferior first molar may produce structural changes, due to drifting, that are first observed in the superior molar region on the opposite side."

J. W. Beach: "Yes, its influence is sometimes on the opposite side of the mouth."

M. Catlett: "Absolutely."

E. H. Smith: "No."

H. T. Smith and C. H. Stricker: "This adverse influence is found especially where there is a loss of support, due to the abrasion of the cusps of the teeth or their incorrect interdigitation."

C. A. Brackett: "Sometimes, yes; sometimes, no. There are instances in which it may be a great advantage to incisor position to extract a third molar and provide no substitute, especially if incisors have been or are to be retracted."

W. Ray Montgomery: "Very often, depending on the occlusion."

G. Hayden: "Yes, in many cases, especially where occlusal surfaces of fillings in other parts of the mouth have not been properly carried to restore cusps, marginal ridges, and sulci."

H. M. Semans: "In youth often to a marked degree; not much after thirty years of age."

H. B. Tileston: "Yes, notably separation in incisal region from loss of molars."

A. H. Suggett: "Yes; have seen a normal occlusion changed to a disto-version by the extraction of a lower first molar. The second molar tipped forward and shifted the bite."

Conclusion: There invariably results, sooner or later, an adverse influence upon occlusion in parts of the arch remote from the immediate area from which a tooth has been lost and a substitute not properly provided, third molars excepted.

Question 7.

Do you believe that a gradual structural change in the supporting tissues is brought about by this shifting of position?

"Yes," answered by 143. "No," answered by 2. Answer evaded by 8.

QUOTATIONS FROM ANSWERS.

T. B. Hartzell: "In the bone and peridental membrane, yes."

J. W. Beach: "Yes, frequently in cementum as well as alveolus."

G. W. Dittmar: "Yes, of the supporting structures; though it may not always have a pathologic condition, it usually does."

H. A. Pullen: "I am certain of it."

C. B. Addie: "Entirely! Dependent largely upon stress."

J. M. Walls: "Usually to some extent at least, and often very marked."

W. B. Dunning: "To a certain extent. Not necessarily of a process in nature, however."

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Conclusion: There is a gradual structural change brought about in the supporting tissues when teeth are permitted to shift.

Question 8.

Do you believe that the integrity of the alveolus and pericementum is reduced by this gradual minute structural readjustment when long continued?

"Yes," answered by 135. "No," answered by 4. Answers evaded by 14.

QUOTATIONS FROM ANSWERS.

P. N. Williams: "Yes, often producing pyorrhea."

T. P. McNulty: "Yes, very much."

H. W. Morgan: "Yes. The altered root relations render mastication less comfortable, consequently it is less exercised."

W. P. Dickinson: "When constructive changes are produced by faulty occlusion."

J. G. Lane: "Reduced in integrity in proportion as function of periodontal membrane is prevented."

R. H. Hofheinz: "It must mean a modification of the pericementum. There is a waste of alveolus, or greater or less change of pericementum."

H. W. Gillett: "In many instances, but not very noticeable in firmly set teeth."

W. E. Farris: "Yes, the readjustment is imperfect."

H. C. Miller: "Structural changes are induced by faulty occlusion."

C. M. Gearhart: "Yes, emphatically."

R. M. Bunting: "It is one of the great causes of pyorrhea."

R. H. M. Strang: "Not by this readjustment, but by perverted strain and stress."

C. R. Jackson: "Only because forces of occlusion are working improperly."

V. H. Jackson: "Yes, as evidenced by depression of teeth and changing of the median line of the arch, although pericementum is often increased in case of irritation."

V. B. Dalton: "Not necessarily."

O. J. Fruth: "Yes, therefore pyorrhea in many cases."

Conclusion: The integrity of the alveolus and pericementum is reduced when long-continued drifting is permitted. This is due to abnormal changes, superinduced by the resulting malocclusion.

Question 9.

Do you consider the NORMAL INDIVIDUAL MOVEMENT *of a tooth essential to its best health and efficiency?*

"Yes," answered by 136. "Yes, positively," answered by 10. "No," answered by 3. Answer evaded by 4.

QUOTATIONS FROM ANSWERS.

A. H. Suggett: "Yes, for a tooth with a rigid appliance becomes loose."

J. H. Kennerly: "Yes, and for this reason I prefer partial plates rather than fixed bridge work."

P. R. Stillman: "Yes, both lateral and occlusal."

C. W. Rubsam: "Absolutely necessary. Nature intended this as a mobile joint."

F. C. Rodgers: "Yes a tooth held rigid by a mechanical appliance interferes with the vitality of the periodontal membrane."

R. H. Hofheinz: "I do. It is doing its appointed work."

P. N. Williams: "By all means. It is a vital principle when retention and bridge work are involved."

A. W. Thornton: "Yes, undoubtedly, otherwise it would not have been so ordered."

H. E. S. Chayes: "Emphatically, yes! underline the *normal.* It is nothing short of biologic blasphemy to inhibit the individual mobility of any tooth. It is just as wrong to augment this motion to any degree. Too little motion means a constantly decreasing supply of nutrient material to the tooth, and particularly to the soft structures in which it sits and to which it is resiliently joined. Too much motion means a stretching and final kinking of the arterial and venous structures —which is followed by all the pathological sequelæ so often seen in the breaking down of oral structures. A dentist would not care to work with his fingers tied or riveted into one mass. A walker could not walk comfortably if his toes were all tied together. Why should a dentist unite his patient's teeth into one mass and make him masticate his food in this manner? It is against all reason. It has no rationale in physics, in physiology, and is against every lesson in evolution which Nature has been trying to teach us for half a million years or more."

C. K. Buell: "By all means."

F. R. Getz: "The age of an individual has much to do with the normal individual movement of a tooth. It is difficult to lay down standards in degree of movement for time of

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life. Except in rare cases, no tooth or teeth can be made absolutely immovable. The danger is mostly in allowing too much movement. Even when serving as abutments under fixed bridge work, they are movable in a small degree and lose little or none of their vertical freedom. I am convinced that under certain conditions determined by the position of teeth that give evidence of mobility which may be characterized as loosening, fixation checks the tendency, and adds to the length of life and efficiency of the teeth if fixed, if the articulation is in harmony with other parts of the arches and the forces of occlusion evenly distributed."

T. P. McNulty: "Yes, hence removable restorations when possible."

C. M. Gearhart: "Without question."

R. Ottolengui: "Absolutely."

R. M. Bunting: "Very important."

A. J. McDonagh: "No; on the contrary, if supporting structures have been weakened, artificial assistance is beneficial."

J. O. McCall: "Yes, but if much support has been lost through periodontal disease, the rigidity of a splint may be better."

J. G. Lane: "Yes, emphatically."

W. P. Cooke: "Desirable, but not essential."

F. A. Delabarre: "Positively so."

J. W. Beach: "Positively, yes."

F. A. Roach: "No."

S. H. McAfee: "If healthy to begin with, yes."

Conclusions: (*a*) The normal individual movement of a tooth is essential to its best health and efficiency. (*b*) A tooth that has become abnormally loose should have its individual movement restrained, but only to the *physiologic* or *normal* limit.

Question 10.

Do you believe that an alveolar support is built wherever the tooth erupts?

"Yes," answered by 136. "No," answered by 3. Answer evaded by 14.

QUOTATIONS FROM ANSWERS.

C. B. Addie: "Yes, but its bulk depends upon its erupting position."

E. A. Bogue: "Sure, and that is why I have striven since 1900 to guide erupting teeth into proper position *ab initio*, thereby saving the necessity of any secondary alveolus being required during eruption. Also I believe that these conditions are not merely local, but that they arise from biologic conditions of the person."

T. P. McNulty: "Yes, but less marked when the tooth is not in occlusion."

V. H. Jackson: "Generally. Every erupted tooth when erupted from the alveolar process has a socket consisting of a cortical layer of alveolar process, surrounded by cancellated bone—excepting, perhaps, that the sockets may not be complete in case of third dentition and in case of supernumerary teeth."

S. H. Guilford: "Everybody does."

F. F. Fletcher: "Yes, what else could support it?"

E. M. Hurd: "Yes; better support built when it meets antagonizing teeth."

Conclusion: An alveolar support is built wherever a tooth erupts.

Question 11.

When teeth are permitted to fully erupt in malposition, do you recognize that this primary alveolus has to be resorbed as the tooth is moved into normal position, and a new or secondary alveolar support formed?

"Yes," answered by 142. "No," answered by 3. Answer evaded by 8.

QUOTATIONS FROM ANSWERS.

S. H. Guilford: "Histology has always taught this."

R. H. Volland: "I believe the primary alveolus is both absorbed to a degree and molded to position, especially when several adjacent teeth are moved practically together."

H. T. Smith and C. H. Stricker: "Roentgenograms on file in Cincinnati show an area of rarefaction immediately surrounding the root of the tooth moved. This indicates that the primary socket is destroyed and must be replaced by newly developed bone tissue."

G. Hayden: "Yes. This knowledge has impressed me with the importance of early orthodontic treatment in many instances."

L. W. Bake: "This depends upon the extent of movement involved. In extreme cases, yes."

A. W. Crosby: "Yes, absorbed on one side and built on the other."

H. A. Pullen: "Not entirely."

S. E. Davenport: "The primary alveolus is

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firmer than that developed after extreme movement of the teeth—a plea, therefore, for *guiding* erupting teeth into their proper positions instead of waiting and moving them later on."

H. E. S. Chayes: "There is no choice. The building of the so-called secondary alveolus is in this instance a biologic sequence."

H. C. Miller: "There is some resorption and rebuilding, but the osseous structures are warped and carried with the root into position."

M. C. Tracy. "More or less so."

W. H. Ellis: "Not necessarily, although it may be partially. In expansion the internal and external plate will spring and cause no change of alveolus around an individual tooth. In the developmental period, the orthodontic force is so applied that any change of movement is, after all, but an assistance to Nature's plan of normal growth, so that any description or discussion of tissue changes would be, after all, but one of normal development. In a normal case the teeth move forward and laterally to a considerable extent during growth without orthodontic interference."

W. D. Tracy: "Partly resorption and partly change in position of alveolar structure."

V. H. Jackson: "Yes, to a degree. It appears to me that when an adult tooth is *moved rapidly* in one direction, as in springing the bone, the cortical socket moves along with the root of the tooth—in which case the principal change is in the cancellated portion of the process, with the added change that necessarily takes place in the outer cortical surface of the process to permit the tooth movement. When moved more gradually, or by irregular force, the evident change by absorption takes place more definitely in the cortical socket."

Conclusion: When a tooth is permitted to *fully erupt* in malposition its primary alveolar support has to be resorbed in varying degree and a secondary or a reconstructed alveolus formed.

Question 12.

As a principle, do you believe it best to provide for the retaining of the primary alveolus by GUIDING *the tooth having a tendency to malposition to its normal place early in its eruptive period?*

"Yes," answered by 142. "No," answered by no one. Answer evaded by 11.

QUOTATIONS FROM ANSWERS.

A. W. Crosby: "Yes, giving the tooth every opportunity possible for individual movement to strengthen the fibers of the periodontal membrane."

A. W. Thornton: "Surely; it is the proverbial 'stitch in time.'"

S. J. Lewis: "It is certainly a better principle to retain the primary alveolar support, guiding the erupting tooth into a position of normal occlusion when there is a tendency for it to erupt in malposition. This is the ideal for the orthodontist to obtain."

C. A. Sayers: "Yes, teeth so guided seem to require a shorter period of retention."

F. R. Getz: "It is logical to think that in early regulation, during eruption and growth of teeth and supporting tissues, we are *assisting Nature.* At a later period it is necessary to *break down* what Nature has already formed, with less assurance of reconstruction."

H. M. Clapp: "Positively, yes!"

R. Summa: "This is the only rational procedure, because Nature at that time of life is growing bone, and it is then merely a matter of guiding Nature's physiological efforts."

R. M. Bunting: "By all means."

A. C. Rich: "As a principle, yes, but other considerations should be entertained."

W. T. Stark: "As a principle, possibly. Have doubts about application of the principle. If the teeth were to be considered alone; but the possible effect on the growing child, its nervous system, lack of proper nutrition on account of nervous irritability, tenderness of stress, and a lot of things, I think require much thought and consideration."

W. J. Brady: "If the tooth can be caused to erupt in the right place, the first deposit of bone will always be better than a later one. Favor early treatment always."

J. H. Kennerly: "Yes, I have always advocated the correction of irregularities as early as possible, so that the primary alveolus surrounding the to-be-erupted teeth may add additional strength to the secondary alveolus which takes the place of that which is absorbed in the correction of irregularities."

C. L. Turner: "Yes, by all means."

R. H. M. Strang: "I believe it better to guide than to force Nature."

R. Murray: "Most assuredly."

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W. P. Cooke: "Always best to aid Nature, the earlier the better."

V. H. Jackson: "Yes, always. The alveolar tissue rebuilt about an adult tooth after its absorption is not so stable."

S. H. Guilford: "Unquestionably."

W. Cavanagh: "Yes, most decidedly."

L. W. Bake: "Yes, I am a great believer in early treatment."

B. E. Lischer: "Yes, always. Every case of dento-facial deformity ought to be corrected or at least under treatment by the twelfth year. The practitioner always assumes grave responsibilities when he advocates postponement of treatment. The best age for treatment of malocclusion in probably 90 per cent. of our cases falls between eight and eleven years. Of the remaining 10 per cent. some ought to be treated prior to eight years; in some it would matter little if postponed to eleven and twelve, but none ought to be postponed beyond twelve years. The best time for orthodontic treatment is during the period of greatest growth—viz, eight to twelve years."

M. T. Watson: "A thousand times, yes."

Conclusion: As a principle, it is best to provide for the retention of the primary alveolar support by *guiding* the tooth having a tendency to malposition to its normal place, early in the eruptive period.

Summary of Conclusions.

(1) (*a*) A constant change takes place in the supporting structures of the teeth with advance of age. (*b*) This is usually gradual, but may at periods make comparatively rapid progress as a result of either local or general causes.

(2) (*a*) The change that constantly takes place in the supporting structures of the teeth is at the minimum when the teeth are in normal occlusion and in proper use. (*b*) This change is, *as a rule,* aggravated in proportion to the degree of malocclusion.

(3) There is always a more or less constant shifting and tipping of teeth that are permanently robbed of their normal proximal support.

(4) Shifting in some degree almost invariably begins coincidently with loss of an adjoining tooth, unless prevented by artificial means. The extent and rapidity will be influenced by normal interdigitation and depth of cusps, by age, and the integrity of the supporting structures, but it will eventually occur, and will be mostly in proportion as the support of antagonizing teeth fails.

(5) As a principle for best practice, it is essential that means be immediately provided for retaining the space between teeth caused by the loss of a tooth except when the natural teeth are to be moved bodily to close the space.

(6) There invariably results sooner or later an adverse influence upon occlusion in parts of the arch remote from the immediate area from which a tooth has been lost and a substitute not properly provided, third molars frequently excepted.

(7) There is a gradual structural change brought about in the supporting tissues when teeth are permitted to shift.

(8) The integrity of the alveolus and pericementum is reduced when long-continued drifting is permitted.

This is due to abnormal changes, superinduced by the resulting malocclusion.

(9) (*a*) The normal individual movement of a tooth is essential to its best health and efficiency. (*b*) A tooth that has become abnormally loose should have its individual movement restrained, but only to the physiologic or normal limit.

(10) An alveolar support is built wherever a tooth erupts.

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(11) When a tooth is permitted to *fully erupt* in malposition, its primary alveolar support has to be resorbed in varying degree and a secondary or a reconstructed alveolus formed.

(12) As a principle, it is best to provide for the retention of the primary alveolar support by *guiding* the tooth having a tendency to malposition to its normal place, early in its eruptive period.

[The report was accompanied by a list of the contributors and a list of the states from which replies were received; also of the colleges represented by replies coming from dental instructors.]

Your Correspondent desires, in the name of the society, to express gratitude to all those who so kindly contributed to this report. It is earnestly hoped that it may be accepted as a "reminder" of conditions that prevail about the teeth with special reference to their supporting structures, and that this will be helpful in governing daily practice.

Respectfully submitted,

L. M. WAUGH, *Correspondent.*

DISCUSSION.

Dr. E. A. Smith, Rome. Dr. Waugh's report is so complete and covers the ground so thoroughly that there is little left to say. In writing to me regarding this discussion, Dr. Waugh suggested that I discuss the question from the standpoint of the general practitioner of dentistry. Consequently, if I seem to digress from the subject it will be because of the fact that in general practice "normal occlusion" must be considered in connection with many other phases of present-day dental practice.

If I made any criticism of the paper, it would be that it savors somewhat of idealism—but perhaps that is not an adverse criticism. If we had to consider this matter of lending every effort toward obtaining or retaining normal occlusion and there were no insurmountable obstacles in our way, my discussion would be very brief, but unfortunately for our peace of mind, progress along other lines in our profession is extending in various directions. It seems to me that only affirmative answers can be given to practically all of the Correspondent's questions, and as they are well answered by so many of our most able men, a discussion as to how to attain normal occlusion —with some of the obstacles in the way of attaining such a desirable condition —would, it seems to me, be of considerable interest to each of us.

Practically every thoroughly equipped dental office now has an outfit for radiography, and we are all turning on our X-rays in the search for blind abscesses and necrotic conditions in much the same way as a battleship covers the waves with its searchlight in its efforts to locate hostile submarines. Every medical and dental society discusses the systemic conditions due to the influence of abscesses and pyorrheal conditions, and rarely do you read a medical or dental journal in which you will not find at least one article on this subject.

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While undoubtedly the professions are going too far in this matter, still the work of Hartzell and others has proved beyond a doubt that arthritis, some rheumatic conditions, nephritis, and different heart lesions are caused by abscesses and pyorrheal conditions in the mouth, and when such conditions do arise, especially in posterior teeth, it often means extraction. Then again, in deciduous teeth, I believe that a large majority of the children who come to us have some teeth with abscesses—or at least with diseased pulp conditions—which, because of the tender years of the child, need extraction, as the possibility of their retention in a healthy condition is out of the question in the majority of cases, and any man who has the temerity to say that he can sterilize and fill those root-canals will not be taken seriously by many. So while we may desire to guide the permanent teeth aright by keeping deciduous teeth the proper length of time, with proper orthodontic methods, other health considerations may make early extractions imperative, and consequently proper guidance of the permanent teeth impossible.

With regard to the necessary loss of teeth in the adult making necessary some form of artificial substitute, as has been indirectly suggested in question No. 9, this matter must be settled by the operator in each individual case that comes to him. If the teeth remaining in the jaw are very firm, a removable substitute may be preferable, but if absorption has taken place the fixed bridge is to my mind the more desirable, provided proper occlusion is obtained. Only last week my attention was called to an anterior fixed bridge with well-fitted bands on Richmond crowns, with perfectly filled root-canals, and this bridge had been in place for thirty-three years; radiographs showed the roots to be in excellent condition, as were also the gums. An argument against removable bridges for replacing these lost teeth is the possibility of the movement of the abutment in the direction of the space, even though the contact points are proper between the artificial substitutes and the remaining teeth; especially has this been observed in the separating of the two central incisors, the root drifting somewhat, even though the contact point is at first correct.

Regarding question No. 6, "Do you recognize an adverse influence upon occlusion in parts *remote from the immediate area* from which a tooth has been lost and a substitute not properly provided?" A case illustrating this condition came to my attention recently. It was that of a man of about thirty-six years, with magnificent teeth, but from whose mouth a dentist, evidently looking for work, had extracted the two lower and one of the upper third molars. None of them had been impacted, but all had plenty of room, and were fully erupted before extraction, yet they were taken out. Their removal had caused a loss of contact points in nearly all interproximal spaces, and there existed a condition of absorption of process and the beginnings of so-called pyorrhea. However, in this case the interlocking cusps were not long, and the teeth were enabled to slide out of position. In a case in practice to which I referred a year ago, that of a young woman whose perfect occlusion was being disturbed because of the forcing to place of third molars all of which were partially impacted, the extraction of all four of those teeth restored the perfect occlusion, and

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there has been no drifting, all the teeth remaining in proper contact.

In conclusion, let me plead for a spirit of tolerance when patients come to us from other practitioners, realizing as we should that never before has proper dentistry been so complex, and in consequence we should think of the possibility that our predecessor may have had a stronger call from some other branch of dentistry—that he may have had the question of the saving of a life to consider. Let us, however, strive to attain the conditions of normal occlusion in so far as we may both through our restorations of lost tooth structures and lost teeth and by the proper guidance of the erupting teeth.

Dr. George Caddick, Albany. I think that the society is to be congratulated upon its selection of Dr. Waugh as Correspondent, and that he should be given a great deal of credit for the amount of work necessary to bring forth such a report. All that is left for the discussers is to endeavor to emphasize some of the conclusions from an individual standpoint, which in my case happens to be that of orthodontia.

A recent writer points out that malocclusion commences as soon as we have a break in the continuity of the arch. It may be the result of a cavity, allowing an adjacent tooth to drift because of the loss of the contact point, thus impinging on the interproximal tissue and causing the loss of the alveolar crest described by Black. Again, it may be the result of faulty restoration of marginal ridges and contact points. Or it may be the loss of a single tooth, allowing the tipping of the other teeth and producing abnormal stress on the peridental membrane, with its attendant results, viz, where there is too great stress the membrane becomes inflamed, and where this is too little, lowered vitality and resistance ensue, due to lack of stimulation.

This shifting and tipping seems to begin almost immediately after the loss of tooth structure, and it would seem necessary to provide means for restoration immediately, as the conclusions of the paper point to drilling and separation in remote parts of the mouth if this is not done. Some of the contributors objected to the restoration of spaces made by extraction on account of the mutilation of good teeth, but in these days of improved appliances, removable bridges, etc., mutilation ought not to be necessary.

Angle says, "The alveolar process . . . . is subservient to the uses of the teeth, as it does not appear before their eruption, and slowly disappears by absorption after their removal. It conforms to whatever position the teeth arrange themselves in, regardless of regularity, so that if tooth movement be undertaken at proper age . . . . the arch . . . . may be much enlarged . . . . to conform to . . . . their new positions." This is especially so in young patients, in whom the process will yield considerably, but as age advances it becomes more dense and unyielding.

This brings us to the consideration of the principle of retaining the primary alveolus by securing early normal occlusion. The prevention of malocclusion is so practicable that every practitioner should be cognizant of the situation. It was formerly taught that correction of irregularities should not begin until about the twelfth or fourteenth year, when all the permanent teeth have erupted, consequently many practitioners are advising that work be delayed at least until the canine teeth are erupted.

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The fallacy of this is seen when we realize that malocclusion, once begun, will continue in response to the force which brought it about. The logical thing to do, then, is to treat it as soon as it is observed, as by so doing a simple malocclusion may be corrected, whereas if uncorrected it may become a complicated condition requiring long treatment. Many cases of extreme malocclusion are the result of simple cases which should have been treated years before, but which have been allowed to wait for treatment later. Or the patient's attention was not called to the fact that the condition could be improved. When this is brought to their attention later in life the question that naturally arises is, "Why didn't our dentist tell us before?"

People are awakening to the fact that when malocclusion is present the teeth cannot be kept clean, and are therefore liable to pyorrhea and decay; that food cannot be properly masticated, that breathing is interfered with, and that the facial lines are modified. It is the general practitioner, the family dentist, who first sees these conditions. He should be able to recognize these cases in the early stages, and give proper advice as to their treatment, thus rendering a valuable service to his patients.

Malocclusion generally begins at the time of the eruption of the permanent teeth, and as it seldom corrects itself, rather being progressive, it is seen that this time is most important in the life of the child as far as correction of irregularities is concerned. It is folly to say, "Let Nature take care of it;" the important thing is to aid Nature as soon as possible. Get her to help at the time most suitable to her. The normal enlargement of the jaw commences at about four or five years of age, and is evidenced by the spaces appearing between the deciduous teeth. If Nature for any reason is not able to do this at the appointed time we ought to find means to help, and the operation will be easier for all concerned if done at the time when it should normally take place.

It is generally conceded that bone development is at an end soon after the twelfth year, and it ought not to require much argument to convince anyone that teeth which are compelled to erupt in proper positions are more liable to remain so than are those which after eruption are moved through the developed bone. When malocclusion is corrected at an early age the time of retention of the teeth is much shorter. By early stimulation we avoid too much disturbance during the years when the tension of school work is particularly high, and this is very desirable, especially in the case of girls. It is well to observe, however, that not all children at five or six years of age are the same in general development, and that this fact must be taken into consideration, lest we become extremists.

In closing, I would make a plea for dentists to see that all restorations approximate the normal. The best efforts of the orthodontist are often nullified by the lack of contact points, by large flat-topped fillings and inlays, crowns and bridges with cusps which do not interlock, and of such shape as Nature never intended them to be. Large amalgam fillings are serious offenders, as they are often carved in such a manner as to avoid stress and contact while plastic.

Only recently I saw a case of lower protrusion which had developed as the result of extensive bridge work. The molar abutment on one side had as beautiful and efficient an inclined plane

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as one could wish for, but unfortunately for the patient, it had no other option than to push the lower jaw forward and to one side.

These remarks may seem to be outside the subject, but I must plead in extenuation thereof my viewpoint regarding normal occlusion.

Dr. Paul R. Stillman, New York. Dr. Waugh has brought to our attention in his report as Correspondent a series of correlated facts in regard to the occlusion of the teeth. Each of these observations in regard to the pernicious results of malocclusion reverts to the one important fact that the supporting structures are of primary interest to dentistry. I have heard this quoted from the great Napoleon, "An army is only as good as its feet." Now, to paraphrase, I wish to say that the teeth are only as good as their supporting structures.

In the study of occlusion we readily differentiate between normal occlusion —which is mechanical perfection and is always an harmonious interdependence of the relations of jaw with jaw and tooth with tooth—and malocclusion, which is a departure from the recognized harmony of the normal. We should subdivide malocclusion into two distinct forms: (1) That indicated and classified by Angle, and treated by the orthodontist, which is largely physiological and is either the result of some pernicious habit or a remote pathological interference with development, and (2) traumatic occlusion, which the orthodontist rarely sees, as it is a development which is never coincident with youth, being an acquired pathological condition observed in periodontoclasia. We find that traumatic occlusion is almost invariably a factor in the etiology of pyorrhea, and is of special interest in the study of periodontia, that branch of dentistry which is devoted to the prevention and treatment of the diseases of the supporting structures.

It is from the standpoint of the periodontist that I desire to make a few observations, and to emphasize if possible this already convincingly strong report of our Correspondent. There is truly "a constant gradual change to be observed in the supporting structures of the teeth with advancing age." We have all observed the atrophic alveolus, the shortening of the interproximal papillæ, and the loss of gingival contour when the adult mouth is brought into comparison with the mouth of normal youth. We should recognize that such a condition is not an inevitable senile atrophy due to advancing age, but an incipient pathological attack upon hitherto normal structures. Often it is the patient who recognizes the alarming condition of his own mouth, and when he asks relief from the dentist, is sometimes told that it is not serious or that nothing can be done; and no effort is made to prevent the fatal consequences which must inevitably follow.

We have heard a great deal said in the past in condemnation of badly fitting bands of crowns and overhanging margins of inlays and fillings, and while I do not wish to lighten one word that has been spoken in condemnation of such operative procedures, in my opinion the injury resulting from these conditions is not to be compared with that which is being done to the supporting structures by that type of bridge work which is, even now, being constructed on the hinge-principle articulator, with an innocent disregard of what is essential in occlusion; in other words, bridge work

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which violates every law of the mechanics of the jaws. Nowhere in the field of dentistry are the laws of occlusion so frequently broken, to the utter destruction of supporting structures, as in this type of bridge work.

What do we mean when we speak of the laws of occlusion? It would be impossible to go deeply into the mechanical principles to be observed, speaking upon so vast a subject in a limited time. By far the most enlightenment on the fundamental principles of harmoniously functionating dental apparatus has come to me through the observations of Gysi, who applied the true anatomical relations of the jaws in an endeavor to overcome certain mechanical difficulties in the construction of artificial teeth for the edentulous mouth. Gysi observed that there was a normal relation of the teeth; that when porcelain substitutes were made to follow definite natural forms and positions, it was impossible for one opposing appliance to exert such force upon its fellow as would permit of dislodgment of the denture; and that it was possible to construct a substitute for the natural teeth—an artificial appliance—with more harmony of occlusion than is found in one out of fifty untreated mouths with natural teeth where the patient has reached the age of forty years. The accurate technique based on these scientific discoveries, making possible the construction of artificial teeth of such excellence, surpasses in my opinion any other achievement of modern dentistry.

It is now time that we apply these principles; that we observe how far the natural teeth are, through drifting, on account of extraction, through wear, on account of attrition, or through any other cause, departing from harmonious relations to the opposing denture. We talk much of prophylaxis, and we mean hygiene, prevention of caries, gingival infection, pyorrhea, etc., but I am convinced that the great advance in prophylaxis will be when there is wider knowledge of the destruction of the supporting structures of the teeth through trauma, and it will come when the profession of dentistry has mastered the principle of occlusion and applied this knowledge in all the branches of our science.

The atrophic symptoms to which I have alluded are, I think, largely due to this acquired malocclusion which *precedes* an interference in the nutritive or constructive processes. Cell life must undergo a constant regeneration, and malnutrition of these tissues is not surprising, when we consider that the vascular structures which supply them are extremely diminutive end organs. When bacteria invade these vessels, embolic masses are formed and stasis of blood flow results. With stasis we have starvation—malnutrition. Even in hitherto normal occlusion, attrition on the occlusal surfaces of the teeth brings about certain changes in the inclined planes, resulting in a lack of harmony in the applied force when the mandible is in closed or lateral positions during mastication. Certain materials, such as gold or amalgam, substituted in the teeth for natural tissues, have, through wear, a different degree of surface loss from the natural enamel, and this aids in producing a traumatic influence upon the supporting structures. Both inequality and absence of wear result in traumatic occlusion. When this symptom is present in any mouth and allowed to persist, there will be a steady retrograde influence upon the supporting structures. Definite and accurate grind-

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ing of these acquired deformities of the teeth—not a ruthless and promiscuous grinding, but a kindly re-shaping with the intention of relieving stress and restoring to the normal in form each tooth so attacked—will go far in the treatment.

Let the student of occlusion always keep uppermost in mind the precept that where occlusal harmony is lost through mutilation, no matter how this has been brought about, whether by wear, by repairs to the teeth, or through extraction, there occurs a coincident loss of function, and upon efficient function depends dental usefulness.

Dr. Waugh (closing the discussion). I do not know that I have anything to add in closing. Inasmuch as the report was not made with the idea of bringing anything new to you, but simply to remind you of the conditions that exist and which must be taken into consideration and relief measures decided upon, I feel that anything I may say in addition to the report would be rather out of place. Therefore I wish simply to thank you for your attention, and to most heartily thank the discussers for the excellent manner in which they have emphasized the points I brought out.

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Report of the Committee on Practice.

By D. H. SQUIRE, D.D.S., Buffalo.

THE effort of the Committee on Practice this year is to bring before the society two important items for consideration; first, the necessity of preserving the soft dental tissues of the mouth in a state of health; second, to discuss some of the conditions which emanate from injury to these tissues during operative procedures from the pathologic aspect of everyday dental practice.

The hard and soft dental tissues of the mouth cannot be held by the general practitioner as having no apparent connection with each other, because their interdependence is today firmly established. Dentistry was a purely technical profession in the beginning, and it has taken years to develop the broader and more scientific side. Beautiful technique operations have been performed upon the teeth without much thought as to the value of the tissues which hold them in their sockets, and which surround the roots of the teeth occlusally as far as the gingival line. This fact brings us to a very brief consideration of the peridental membrane and the gum tissue, in order to emphasize this important relationship.

We all know, or have known at one time, the structure and the function of the peridental membrane, yet I feel that you should hear it again and again, and tolerate it in a better spirit even than you do a sermon each Easter-time, because it makes you think when you are tempted to be careless.

PERIDENTAL MEMBRANE.

The peridental membrane is made up of white fibrous connective tissue, which is divided into two classes—(A) The principal fibers, which perform the physical function of the membrane, and (B) the interstitial fibers, which fill in the spaces between the bundles of the principal fibers and also surround and protect the bloodvessels and nerves.

The membrane is also divided into three portions, occlusal, alveolar, and apical. The principal fibers, according to Noyes, spring from the cementum, and are attached at their other extremities to the connective tissue supporting the epithelium, the fibrous mat of the gum tissue, the cementum of the approximating tooth, the outer wall of the periosteum at the border of the alveolar process, or the bone of the alveolar wall. These fibers as they arise from the cementum are in large bundles, but break up, soon after their attachment, into

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smaller ones which interlace with other fibers and pass around the bloodvessels in their course.

Beginning at the gum line, the fibers are attached at one end to the cementum, and, after passing outward a short distance and turning upward toward the crown of the tooth, enter the gingiva and unite with the fibrous mat which supports the epithelium. These fibers are better developed on the side of the tooth where the stress is greatest from the pressure of food during mastication. Underneath this layer the fibers which arise from the cementum on the labial and lingual sides pass out at right angles, and are inserted into the coarser fibrous mat of gum tissue. On the proximal sides, at the same level, the fibers after their origin branch and interlace as they pass across the interproximal space, to be attached to the cementum of the neighboring tooth. These fibers form the supporting framework of the gingiva in the interproximal space.

Still farther occlusally, the fibers incline apically, and a short distance from their origin unite and form large bundles, which join the fibers from the outer layer of the periosteum extending over the labial and the lingual border of the alveolar process. On the proximal sides of the teeth, the fibers which arise from the cementum at the same level are attached to the surface of the root of the adjoining tooth, while others inclining apically are inserted into the bone of the septum. These are the fibers which hold the tooth down in its socket. At the border of the alveolar process and in the occlusal third of the alveolar portion, the fibers pass horizontally from their origin in the cementum to the bone. In the middle and apical thirds of the alveolar portion, the fibers are inclined occlusally in their direction from the cementum to the bone. These fibers arise from the surfaces of the root in compact bundles, but are attached at their other extremity to the bone in fan-shaped fasciculi, covering a large area of the alveolar wall. These fibers support the tooth against the force of mastication. In the apical portion the fibers pass outward in all directions from the cementum, being attached in the same manner as the fibers of the alveolar portion to the wall of the apical space.

In this incomplete description of the fibers of the peridental membrane it will be seen that their arrangement is very complicated both in regard to their direction and their attachment, and the thought I wish to drive home is this—that when the gums are cut and torn during operations the peridental membrane is also cut and torn, paving the way for its final destruction in many instances.

The thickness of this membrane has a great bearing upon the operation for the condensation of gold. If the membrane is thin and the tooth is firmly settled in the alveolus, there will be a decided ring from the blows of the mallet, while if it is thick, the fibers being long, the blow will be dull, as if the tooth were on a cushion, and the movement of the tooth will be considerable at each impact. In the former case the energy of the blow is expended upon the gold, and in the latter upon the sag of the fibers of the peridental membrane. Noyes gives this fact as the probable reason for the failure of gold to preserve the teeth of young children, and it is exceedingly important that we should remember the changes which occur in the thickness of this membrane as cementum and bone are developed.

The peridental membrane is unusually

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well supplied with blood, which accounts for its ability to functionate under the most unfavorable conditions. The vessels enter the membrane in the apical region from the medullary spaces in the bone. Some, passing through the foramina in the apex of the root, supply the pulp of the tooth, while others pass through the membrane, giving off branches to the alveolar wall and receiving others from it. At the border of the alveolus branches are given off, which anastomose with branches from the periosteum and from the gum tissue. The cancellous bone of the alveolar process is richly supplied with bloodvessels, and the anastomosis of these vessels with those of the membrane from the alveolar wall and with those from over the border of the process is of pathologic importance. Infections about the periapical space often cause the supply of blood in this region to be entirely cut off, yet this does not affect the blood supply of the rest of the membrane, therefore it is erroneous to believe that the removal of the dental pulp will in any way increase the blood supply to the peridental membrane.

From a clinical point of view, the relationship of the bloodvessels and the principal fibers of the peridental membrane is of unusual importance. When force is brought to bear upon the tooth's surface, either in mastication or in the malleting of gold, the principal fibers are stretched. This movement closes some spaces in the tissue and opens others. The arteries and veins in the closed spaces are constricted and the current of blood through them partly shut off or reduced, and a compensating dilatation occurs in the enlarged spaces. When the force is removed, the constricted vessels become enlarged and the dilated vessels constricted. If these movements are continued for any length of time, an acute inflammation will ensue; therefore teeth should be braced during prolonged malleting operations or when there are open contacts.

The nerve supply gives to the membrane the sensation of touch, which is its only sensory function. The slightest movement of the tooth affects the nerves which are situated between the fibers.

GUM TISSUE.

In order to fully understand the relation of the gum tissue to the peridental membrane, it will be well to define what is meant by the gingival line, gingival margin, and the gingiva. The gingival line extends around the neck of the tooth at the line of junction of the enamel and the cementum, and is the point of attachment of the gingivæ. The gingival margin is that portion of the crown of a tooth which is next to the gingival line, while the gingiva is that part of the gum tissue which surrounds the neck of the tooth crownwise from its attachment at the gingival line. This portion is called the free margin of the gum. It is important to remember that there is a free flap of gum tissue that is held closely to the surface of the neck by the fibers of the peridental membrane.

The gum tissue is soft in texture, being composed of connective tissue containing many white fibers. These fibers form a strong membranous mat, which is continuous with the peridental membrane at the necks of the teeth, and with the periosteum of the alveolar wall beneath. It is covered with a strong coat of squamous epithelium having a rich supply of bloodvessels and nerves. The free margin of the gum is very high

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upon the crowns of the teeth in the young subject, often only exposing about half the length of the crown, but as age advances it becomes shorter, until it recedes to a point near the gingival line. In addition to surrounding the teeth, the gingivæ fill in the space between the teeth known as the interproximal space. The gum extends from the labial aspect of the anterior teeth and from the buccal side of the posterior portion of the alveolus to the lingual side, and rises up to the proximal contact point of the teeth in the form of a septum. The labial, buccal, and lingual surfaces of the septum act as inclines, over which the food glides during mastication into the spaces between the outer and inner sides of the alveolus. If it were not for the normal anatomic relations of the structures, the food would pack into the interproximal spaces, and through its irritating influence degeneration of the gingivæ and of the peridental membrane would ensue. Therefore the preservation of the gum tissue in its normal relation to the peridental membrane and its protection by the position and the shape of the crowns of the teeth is the keynote to the whole situation in the prevention of marginal peridental infection. It is, then, of the greatest importance to guard against those conditions which produce irritation of the free margins of the gums.

In the interest of the propaganda of preventive medicine, and in the maintenance of bodily health, it has been demonstrated beyond all question that a clean mouth is a most essential factor. Cleanliness of the oral cavity is not obtained by systematic brushing of the teeth alone, but by the removal of all concretions upon the surfaces of the crowns and the roots of the teeth, together with elimination of all irritation of the gum and the mucous and peridental membranes. While it is necessary to have the full complement of teeth for the proper mastication of food, it is of still greater importance, from the viewpoint of health, that those tissues which surround the teeth should be in a normal condition.

The health of the peridental membrane is of paramount importance in its relationship to the retention and the usefulness of the teeth. A man in reality is only as strong as his peridental membrane. Cavities may be thoroughly excavated and accurately sealed, but unless the ideal is an anatomic restoration in its minutest detail, the effect upon the peridental membrane is observed at once. If the balance of harmony has not been re-established between the hard and soft dental tissues, irritation of the gum and peridental membrane will ensue. The shape of the teeth affords adequate protection to the surrounding tissues, and as long as this relationship is maintained food is triturated without the slightest discomfort, and the influence of the force in mastication is all the exercise that the membrane needs.

IMPORTANCE OF NORMAL OCCLUSION.

In presenting some of the causes of peridental disease, it cannot be passed without briefly mentioning the influence of occlusion. This subject has been so thoroughly presented by your Correspondent that I shall only allude to it. The foundation for the preservation of this membrane from injury and disease must be laid in early life—indeed, with the treatment of the deciduous teeth of the child. These temporary organs, which have sometimes been considered by members of the profession as of not

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much importance and hardly worth repairing, have been neglected, and finally extracted without a thought as to their influence upon the future welfare of the dental organs. These teeth should be retained in the jaws, not alone for the purpose of mastication of food and their influence upon the eruption of the permanent teeth, but for the future adjustment in the relationship between the hard and soft tissues of the mouth. It is during this period of growth and development of the jaws that changes are wrought through the neglect of the temporary teeth which lay the foundation of inharmony between these structures. This influence, coupled with acquired and inherited tendencies, is of the utmost importance in the destruction of the peridental membrane later on in life.

The lack of balance in the development of the contiguous parts is also indirectly due to the malposition assumed by the erupted permanent teeth. It is also manifested in the development of the nasal, antral, frontal, and ethmoidal sinuses. It is the duty of the dentist who would prevent peridental disease to watch for these conditions, and to correct those influences which interfere with the establishment of normal occlusion of the permanent teeth.

Angle says, "The size, forms, interdigitating surfaces, and positions of the teeth in their arches are such as to give to one another, singly and collectively, the greatest possible support in all directions." Therefore the cusps of the crowns so interlock in normal occlusion that their inclined planes keep the teeth in their proper relation with one another. These intercuspal relations are such that if any part of the contour of the crown is removed, the efficiency of power in mastication is lessened, and the balance of harmony is disturbed. When the alignment of the teeth is broken and they gradually assume an improper position, due to the action of the fibers of the peridental membrane, there is an unrestrained movement of the tooth; the angle of force from the occluding teeth is also changed, and losing the natural support through lack of contact, the teeth drift farther and farther out of position. This constant misdirection of force is one of the exciting causes of peridental inflammation.

A normal antagonization of the permanent teeth is absolutely necessary to the preservation of the soft tissues. It has been said that "Nature always tries to reach the ideal but seldom accomplishes it," and we find that in many instances the occlusion of the teeth is not an ideal one until it has received dental treatment. The faults of form as the result of incomplete restoration of a tooth's surface with filling materials, the improper making and placing of contact points upon the proximal surfaces, the restoration of cusps and ridges upon the occlusal surfaces, have a vital influence upon the retention of the teeth in the jaw, and secondarily upon the health of the gums and the peridental membrane.

The adjustment of separators and clamps, the laceration of the gums in the use of strips, disks, ligatures, scalers, all have their influence in the inception of infection and perhaps permanent injury to the peridental membrane. In extensive wedging care should be exercised to avoid tearing those fibers of the peridental membrane which pass from one tooth to the other across the interproximal space. All spaces between the teeth should be closed. It has been quite customary when a tooth has been lost early in life and the space partially closed to

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allow the space to remain closed. Such treatment is wrong. A proximal contact should be made. There is a cause for an inflamed area about the teeth, and it is the duty of the practitioner to appreciate this fact and correct the condition.

These facts mean much to the dentist, as the restoration of tooth forms along anatomic lines is necessary for efficiency in mastication and for the prevention of peridental disease. It is therefore important to bear in mind from the medical and dental viewpoint that there are many local conditions which interfere with the health of the peridental membrane besides those which are considered of constitutional origin.

ROOT-CANAL TREATMENT.

Much has been written upon the treatment of root-canals, and much debate has taken place upon the accurate stopping of the apex, the advisability of the materials' protruding beyond the root end, and the removal of the apical portion of the root. It would seem that more time has been devoted to these technical procedures than to methods of maintaining asepsis during the preparation of the canal for either filling or amputation of the root end. What difference does it make in the ultimate result if we have subjected the entire area of the root-canal to infection during this technical procedure?

It is the consensus of opinion that not only must the instruments used for pulp treatment be sterile, but that the cotton, paper points, filling material, and in fact everything that comes in contact with the root-canal, must be sterilized just previous to the operation. I can distinctly remember in my time seeing a dentist wipe his lancet off on the seat of his trousers and carefully put it away in a handsome plush case—sterilized for the next operation! Today we have not advanced so very far in our root-canal treatment. Cotton is wound upon broaches with hands that have come in contact with many things in the office which are not surgically clean, and then the cotton is placed quite to the apex of the root, in close proximity to the soft tissues in this region. It requires not a little skill to do this, but it also requires just as much faith that there will not be a systemic infection from the unclean materials which have been carefully sealed in the root-canal with a non-porous cement! It is not even safe to depend upon maintaining asepsis during these operations by using cotton or bibulous paper direct from their original cartons that have at some time been sterilized.

Many failures in the treatment of root-canals result from poor access to the canals. One cannot expect to thoroughly ream and cleanse this portion of the tooth without first exposing to view the surfaces to be operated upon. The rule that "the walls of the cavity should be made parallel with those of the pulp chamber" should always be followed. The mechanical reaming of canals is more far-reaching in maintaining aseptic conditions than is the medicinal treatment. This removes the infected pulp tissue from the walls of the canal and that portion of the dentinal wall which has been exposed to infection, and it also increases the size of the canals so that they may be accurately filled with gutta-percha cones, all of which tends to insure the tooth against reinfection.

Instruments for improving the technique of root-canal treatment have been exhibited at the several meetings during the year, and their merits should be in-

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vestigated by every general practitioner. The instrument known as the "bristle" for exploring minute canals, the set of files known as the "Best" files, the "Rhein" picks, the broaches from x to xxx, the drills for hand use, and the little instrument called the "apexographer," designed by Dr. Gillett, are all extremely clever, and enable one to do a much better grade of work.

When root-canals have been thoroughly reamed and enlarged so that they may be filled with gutta-percha cones, the use of resin and chloroform will perhaps seal the several openings more thoroughly than eucapercha compound, but this is a subject that demands more thorough consideration.

The importance of radiographs taken before and after treatment of root-canals cannot be overestimated, as these not only show the conditions with which one has to cope, but the final result of the filling process. It is well to sound a note of warning, however, to those who become enthusiastic over new things, that all of the opaque areas about the apices of the roots of teeth do not indicate systemic involvement or extraction. The pendulum is beginning to swing the other way now, and teeth are being sacrificed upon the altar of rheumatism, arthritis, phlebitis, endocarditis, and all the other *-itis*es. It is time to discriminate between those teeth which are sources of internal infection and those which only show incipient disease. The successful practitioner of the future will save the teeth and preserve the apical tissues from infection in many cases by a regeneration of his aseptic (?) methods in the initial treatment of the root-canals. There can issue only one result from the discussion of this essential question of bodily infection, viz, an enhanced interest in the conservation of the dental pulp and a careful consideration of the amount of tissue involved in the apical region when the pulp is dead.

The methods of sterilization employed prior to devitalization need attention. In many cases cavities are not thoroughly excavated of all decayed tissue, and again the softened and degenerated dentin over the pulp, as well as the exposed surface of the pulp itself, is in a septic condition, and in producing pressure anesthesia the bacteria can readily be forced with the cocain directly to the apical region. Arsenic, especially when used liberally, is responsible for necrotic conditions in the apical region—for who will say that the action of arsenic ceases exactly at the apex of the root?

There are other conditions to be met in the solving of this question of vital teeth. We are told that the function of the pulp is completed when the apices of the roots of the teeth have been developed, and that it has no further important office to perform. We know that as age advances and the teeth are affected by erosion, abrasion, caries—or when the environment of a pulp has been changed due to tooth restoration with metals, cements, etc.—that pathologic changes take place in the pulp tissue in its attempt to equalize or re-establish former conditions by a secondary deposition of dentin from within. This is done at the expense of its vitality, and in due course of time the canals become constricted and sometimes practically inaccessible as the secondary dentin is built up. Is it better to devitalize when we feel that such conditions will surely take place, or meet the emergency when the actual time arrives? This question is important, and can only be settled by careful and painstaking examination of each individual case.

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ROOT AMPUTATION.

Best gives a very good technique for root amputation, as follows: "A liberal half-circle incision is made over the infected area; the flap turned toward the gingival with a periosteum elevator. The muco-periosteum is pushed back, exposing the bony plate covering the root. Caution at this point must be taken not to make our opening through the bone any farther from the apex than is indicated. With a grooved chisel cut along each side of the root, then with a bone-bur cut from one groove to the other, thereby passing through the root. The root tip is now loosened and removed, the abscess or granuloma removed, and then, with a large round bur or a spoon curet, all of the necrotic tissue is scraped out, the edges of the wound are smoothed up, packed with iodoform-novivaim powder, and the edges are drawn together with a silk ligature."

We appreciate the fact that when a tooth may be rotated in its socket with the fingers it is practically useless as an organ of mastication. It would seem to be a fair deduction to state that when the necrotic condition of the peridental membrane involves the attachment of its fibers to such an extent as to destroy those which sustain the tooth against rotation, any attempt at a cure would be useless. When the fibers have been removed from the surface of the cementum they can be reattached to it only by the formation of a new layer of cementum and the building of the fibers into it. This may be done if the condition can be controlled and the cementoblasts are normal and in a vitally active condition. Amputation is therefore a difficult surgical procedure, and one which calls for intelligence and skill. I do not wish to discourage this practice, because I thoroughly believe in it, but I am of the opinion that it has its limitations, and that the operation should be approached with caution.

The alveolar abscess will be almost a condition of the past when we realize that it is necessary to devote a sufficient amount of time in the initial examination to ascertain whether a pulp is in a normal state, and the probable effect of restorations upon its vitality.

STATUS OF EMETIN TREATMENT.

Dr. M. T. Barrett virtually claims that endamœba gingivalis in symbiosis with bacteria is the specific cause of typical cases of pyorrhea alveolaris and also of most cases of gingivitis, and that emetin, a known amœbicide, is a specific therapeutic agent.

Pure strains of amœbæ cannot be cultured for longer than seventy-two hours. It has therefore not been possible to try inoculation experiments. In the absence of positive proof in accordance with Koch's postulate, Dr. Barrett bases his claims on three points: (1) The presence of endamœbæ in all typical cases, (2) absence of endamœbæ from normal mouths, and (3) disappearance of endamœbæ and also of pus under emetin treatment. He cites in support of his position the acceptance of quinin as a specific in the treatment of malaria before Koch's postulate was fulfilled. We might equally well claim that salivary and serumal calculus is a specific cause, and that scaling is a specific curative of pyorrhea because of the results obtainable. The same claim might also be made for malocclusion.

Examination of Dr. Barrett's claims show the first to be correct; claim No. 2

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has been disproved, and the amœba found to be practically universal. Dr. A. H. Merritt cites examinations made by himself and also by the research laboratories in the New York City Health department which show this conclusively. Claim No. 3 with regard to disappearance of amœbæ and pus has been very hard to substantiate. Dr. Merritt and Dr. Hartzell* both contribute articles agreeing on this point. Experimental work at the University of Buffalo Dental School by Dr. Lane gave the same results.

This does not necessarily prove Barrett to be wrong. A certain amount of benefit can be obtained with emetin in many cases, but the emetin treatment can hardly be considered a "scientific" treatment as claimed by Barrett and others. Cases treated surgically do not show any further improvement when treated with emetin. Experience, which is the most scientific procedure we have at present to depend on, has also shown that no etiological factor which is present, as for instance malocclusion and improper root surfaces, can be given any less attention because emetin has been used. This is counter to Dr. Barrett's claim that emetin lessens the amount and difficulty of pyorrhea treatment.

We must recognize that in practically every case of pyorrhea there are two or more etiological factors present. These factors can be divided into two groups, those favoring health and those favoring disease, and the type of case and the measures necessary in the treatment will depend not only on the factors present, but on the relationship or balance between them.

* Merritt—*Dental Cosmos* for January 1916, p. 62. Hartzell—*Journ. Allied Societies*, March 1916.

DISCUSSION.

Dr. A. Berger, New York. The topics discussed by the essayist in his paper are of such concern to our profession that their consideration should and must appeal to every progressive practitioner of dental surgery. Never before in the history of dental surgery has there been such an urgent call upon the profession to assume the responsibilities which we have for years claimed to be ours, and consequently this seems to be a very auspicious time to justify the claim.

The future status of the profession will be largely determined by our response to the demands of the times, by the manner in which we meet our professional obligations, and by the efficiency with which we solve the problems confronting us.

In view of recent studies, experiments, and clinical observations, it is manifest that, as suggested by the essayist, we can no longer continue to regard the teeth as independent entities; that we cannot isolate them from the rest of the human economy and practice dental surgery rationally—not confining ourselves to the limited study of the teeth, their restoration, and their prosthesis. We must recognize the inter-relationship of the

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entire body, in which the mouth is not the negligible factor it was for some time believed to be.

It is in this tendency toward broadening our professional sphere that the virtue of Dr. Squire's paper lies, and for this alone it is worthy of commendation, though I might have wished it to be somewhat broader or more specific.

It would be impossible, in the short period of time allotted to the discussion of the paper, to enter into an exhaustive consideration of any of these topics, and for this reason I shall restrict myself to the more salient points and their bearing upon our everyday practice.

The essayist in his paper takes up first and very judiciously the consideration of the peridental membrane and the gingivæ. Since these tissues are very often the site of pathological affections, and because a healthy condition of these tissues is necessary to the preservation of teeth and the maintenance of their proper functioning, consideration of the histology, the physiological function, the pathology, the agencies most frequently productive of lesions, and the possibilities of repair and regeneration of these tissues is of prime importance.

I wish to take exception here to the author's statement that a clean mouth is essential to the maintenance of health. From a pathological standpoint a clean mouth does not always imply a healthy condition.

One of the most frequent oral affections and one which most often affects the tissues above mentioned is pyorrhea alveolaris. Of the various lesions and pathological manifestations which we include under this collective term we still know surprisingly little, in spite of the extensive literature, the various theories, and the diverse speculations written and advanced on the subject. We know very little about its pathogenesis, less about its etiology, and yet we pretend to know something about its cure. It seems that as soon as we are about to accept some man's theory on the subject, our very next case proves a contradiction to it.

In the treatment of pyorrhea alveolaris hardly any changes have been made in recent years that could be considered as improvements upon those advocated by Dr. Riggs, with the possible exception of the construction of various kinds of instruments to suit the fancies and idiosyncrasies of different operators. What we *do* know—and in this all who claim to be authorities on the subject concur—is that proper surgery and instrumentation will cure pyorrhea alveolaris in its incipient stage, and check in a great measure almost all advanced cases; that proper instrumentation will secure good results regardless of and often in spite of medication. I hope that there are at the present time none so ridiculous as to use such powerful escharotic agents in the treatment of pyorrhea as ammonium fluorid, trichloracetic acid, phenol, and other drugs, the use of which is diametrically opposed to all principles of modern surgery. The claims of recent investigators in this field that the amœba is the specific organism causing the disease, and that emetin and other ipecac derivatives administered internally, hypodermically, or locally, are specific remedies for the cure of this affection, have been sufficiently disproved by proficient investigators to all except probably their originators. The only good that emetin has done has been to stimulate interest in this direction, and to prompt some practitioners to use their instruments more assiduously. I wish to mention in this connection that in all pa-

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tients afflicted with pyorrhea the systemic condition should be inquired into, and appropriate treatment instituted for the correction of any disease conditions disclosed.

The next pathological phase of dental practice which claims our attention is the treatment of pulpless teeth. The essayist truly states that much has been said and written on the subject, and still we are far from the solution of this much-discussed problem. It is rather unfortunate that many of our best operators are satisfied to limit the possibilities of proper practice in this field to their own sphere and to their own capabilities. There seems to be no thought given to the fact that there are men of average abilities, and that the great bulk of humanity who are in need of and have a just claim upon our professional services are of limited means. The solution advocated by some—*i.e.* promiscuous extraction of pulpless teeth—is undignified and unprofessional. Not until some mode or means is discovered which will be available to all dentists, accessible to all who require our services, and effective in all cases and conditions, will this problem be solved. It is quite pertinent in this connection to dwell somewhat upon the much agitated and discussed infectious foci about devitalized teeth. This problem is presenting a more formidable aspect, so much so that we can no longer ignore it; nor can we meet the issue with palliatives or anodynes, but must face it and deal with it with a seriousness in accord with the most grave effects ascribed to these infectious foci. Though absolutely scientific evidence is still lacking to bear out their reported insidious character, clinical evidences are pouring in upon us from all directions from day to day which are sufficiently conclusive to convince the most skeptical. Be that as it may, we are certain of one thing—that pathological conditions are present, and that every effort must be exerted toward their prevention and eradication.

It is impossible, as the essayist suggests, from a clinical aspect to determine which focal infections are merely local in their influence and which are causes of systemic disturbances. No doubt the factors which determine the character of infections in other parts of the body are applicable to infections localized in the buccal cavity—namely, the number of bacteria present, the virulence of the bacteria, and the susceptibility of the patient. While we often see patients with very extensive forms of localized infection without any apparent systemic disturbances, we also see others with but slight local infectious conditions suffering from very severe and grave secondary lesions.

The rational treatment of the problem confronting us in pulpless or, more properly speaking, devitalized teeth, may be classified under three headings: (1) Prevention, consisting of the proper root-canal therapy in the original treatment of these teeth. (2) The eradication of an established infection by proper root-canal therapy. (3) Surgery as indicated in the individual cases, namely, proper root-canal therapy combined with curetting, root-canal therapy combined with root amputation and curetting, and extraction combined with curetting.

It is rather irksome and difficult in some instances to determine what measures should be adopted, and what would be the most expedient and most favorable in a particular case. There is one thing, however, that we all ought to feel very keenly, and that is the desirability

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of saving all teeth without jeoparding our patients' welfare and health.

The essayist, inadvertently I think, contradicted himself in two different paragraphs bearing on the subject of root-canal operations. He first says—"It would seem that more time has been devoted to these technical procedures than to methods of maintaining asepsis during the preparation of the canal for either filling or amputation of the root end. What difference does it make in the ultimate result if we have subjected the entire area of the root-canal to infection during this technical procedure?" In a later paragraph he says—"The mechanical reaming of canals is more far-reaching in maintaining aseptic conditions than is the mechanical treatment." While I am fully in accord in the main with the essayist on these points, I would modify his version of it by stating that thorough mechanical cleansing must be inseparably coupled with absolute asepsis in order to obtain the best results. It seems inconsistent to me for the essayist to separate the technical procedure from the maintenance of asepsis. Permit me to remark that proper technique implies asepsis—asepsis of the same character as is maintained by the surgeon in a major operation. In brief, without specification, all articles or substances which come in contact with the area of operation should be absolutely sterile. I fully concur, however, with Dr. Squire that thorough mechanical cleansing, namely, the absolute removal of all organic contents of the pulp chamber and root-canal, is of paramount importance, as we do know that permanent sterilization by means of the drugs at present at our command is impossible.

With reference to proper asepsis, I have for some time had some thoughts which I scarcely dared to express for fear that I might be branded as a revolutionist. To secure surgical cleanliness we should commence with some radical changes in our equipments. I am assuming here that we are thoroughly familiar with all principles of asepsis. It seems to me that the equipments offered and sold to the profession by the supply houses are devised more for ornament than for utility, and tend to impede rather than facilitate asepsis. Our equipments should be so constructed and so arranged that the maintenance of sterilization should not complicate our work. I believe that I am expressing the opinions of a great many men when I say that with the equipments furnished to us at present, absolute asepsis is well-nigh impossible. I am not saying this to exculpate some nor to offer any excuse for slouchy tendencies, but because I believe that a great deal of improvement can be made in this direction.

We all recognize the value of the radiograph, and we find it practically indispensable in connection with all phases of our work. I fear, however, that radiography in root-canal work may become subject to a great deal of abuse. For example, the fact that the apex of a tooth has been reached, as evidenced by a piece of wire introduced into the root-canal, by no means signifies that all of the organic contents of the canal have been removed. Again, a good many operations are performed as the result of faulty reading of radiographs, non-existing conditions being often read into radiographs as well as existing conditions overlooked by men who profess to be specialists in radiography. We recognize the fact that the radiograph is an excellent aid in our work and of great

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diagnostic value, but our diagnosis must be based upon the clinical symptoms, coupled with the radiographic findings.

A brief consideration of the operation of root amputation, which is becoming more and more popular, might be somewhat relevant. Like all procedures of technique for operations which radically depart from the usual mode of practice, root amputation has its advocates and opponents. It seems to me that the great number of failures in this operation are due to its improper employment. Its performance should be approached not only as the essayist states, with a great deal of caution, but with a great deal of discretion and discrimination. Some men seem to be under the impression that it is employed primarily as an abscess cure. It is merely a complementary measure employed for the eradication of infected areas and tissues from about the root apices, and the root apex itself when this is a source of infection. When employed in cases where its use is indicated, and with proper technique observed, it will almost invariably yield good results.

Dr. Bertram Ball, Yonkers. Our society is indeed fortunate in having so strong a *personnel* on the Committee on Practice. The examination of past reports reveals the fact that this committee is always in the front rank, keeping us fully informed as to the best methods of practice, and guiding us away from the rocks.

No other tissue of the mouth is being so closely studied at the present time as the peridental membrane. The permanent cure of pyorrhea alveolaris will undoubtedly come to us ultimately through an understanding of the pathology of this tissue. The great increase of this disease has caused a widespread interest in it and its cure. No greater good could come to us than this opportune refreshing of our memories as to the structure and function of this membrane. As Dr. Squire has so aptly said, we all know, or have known at one time, its structure and function, but because of the arduous pursuit of happiness and the absorbing practice of our busy profession many of us have forgotten our histology. Every little while some theory is advanced; we try it, and experience proves it a fallacy. Our pyorrhea experts now discredit the removal of a healthy pulp in order to increase the blood supply to the surrounding peridental membrane. In my personal practice, recently, I have had a case of pyorrhea in which two adjacent teeth were badly affected. They were equally loose, and the pus condition seemed about the same. One had a live pulp but in the other the pulp had been removed. The tooth with the live pulp on being treated became firm in its socket, and shows at present very little movement, while the tooth without its pulp is still quite loose and apparently cannot be tightened, though the patient finds it much firmer than it was before.

If our scientists could develop a technique whereby the peridental membrane could be reproduced on a denuded root, it would be a wonderful forward step in the tooth-saving campaign. It would seem timely to emphasize the necessity of a proper amount of exercise for the peridental membrane in order that it may functionate properly and remain in a healthy condition. In years gone by this would have been unnecessary, but in this age of predigested foods, the handy bakeshop, and the delicatessen store just around the corner, we find a condition which needs attention. The dentist

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must now exercise care in recognizing the causes of diseased conditions, and advise his patients to see that the food provided is of a character which gives a proper amount of exercise to the tissues of the mouth. Chewing gum would seem to be an aid to this end. Only recently I read an article stating that a Wisconsin state school official had recommended to school authorities that provision be made in the schools for supplying chewing-gum to the children. We will look with interest at the result of this experiment.

It is hardly necessary to reiterate that the proper contour of fillings is as absolutely essential to the health of our patients as the removal of decay, but we still see cases quite frequently where no thought has been given to contouring fillings. A mouth in which faulty dental work has been done cannot be kept in a healthy condition, nor can it be agreeable to the patient. When the patient is educated to the fact that the unpleasant and unhealthy mouth is due to improper dental work he will go to a competent dentist and have his mouth made clean and healthy. The advertising dentists have created a false impression in the minds of the public by representing to them that health of the mouth is provided for by the mere placing of teeth in the mouth. It is our duty to teach the public that cleanliness of the mouth is far more important to the patient's health than elaborate mechanical dental work. A campaign of education along this line would in a few years eliminate the advertising dentist from the practice of dentistry.

With regard to root-canal work, I heartily agree with our committee that mechanical and chemical reaming of root-canals is more far-reaching in maintaining aseptic conditions than is medicinal treatment. In small root-canals, namely, canals in mesial roots of the lower molars and labial roots of the upper molars, may we suggest adding chemical to the mechanical reaming. The use of a fifty per cent. solution of sulfuric acid will not only increase the size of the root-canal, but will assist in the removal of pulp tissue which cannot be removed with the broach or by mechanical reaming. These flattened root-canals many times contain tissue in spaces so small that no broach can possibly remove it. The sulfuric acid solution will dissolve this tissue and also destroy any bacteria present, and we save eighty per cent. of our troubles that come from broken root-canal drills and broaches. Many will argue that the sulfuric acid dissolves away too much of the tooth structure, but this could only result from the improper use of the sulfuric acid. Then again, some men argue that it is liable to go through the apex of the root of the tooth and set up necrosis, but there is absolutely no danger of this if the operator is careful not to use too much of the acid.

A good point on this subject is to use only as much acid as can be carried on the barbs of an extra-fine broach. We have so many curved and flattened root-canals that the mechanical and chemical reaming combined is more effective than simply the mechanical. I would like to ask the essayist if it has been proved as a scientific fact that in pressure anesthesia bacteria travel to the apex of the root as quickly as the cocain. If that is true, much greater care must be taken to avoid forcing bacteria through the apex. In root amputation, instead of packing the wound with iodoform-novivaim, I would suggest packing the wound loosely

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with iodagol dressing on cotton, this having the advantages of being odorless, having comparatively strong antiseptic qualities, tending to alleviate much of the after-pain, and stimulating a new growth of tissue.

Much is being said both for and against emetin treatment in pyorrhea. Many men are reporting success in their pyorrhea work by the use of emetin. As our committee report says—"Practice and experience alone will determine the efficiency and the value of this drug." As in every new method, all men do not secure the same results with emetin, but men who a year ago at our dental meetings were very much opposed to the use of emetin now admit its value and recognize the fact that it is not only useful but a very valuable adjunct in the successful treatment of pyorrhea.

Along this line it might be well to call attention to the fact that many men are reporting good results from the local application of the colloidal iodin preparation which has lately been put on the market. Daily local application of this dressing removes the serious element of soreness to the teeth and gums during the period of instrumentation. It clearly shows to the operator the fields which need further instrumentation. It reduces the inflammation of the gums quickly, and restores them to a normal condition better than any drug so far brought to our attention. Pharmacologists would do well to tell us what effect this drug has on the peridental membrane and the gum tissue, for it has not been on the market long enough to give one sufficient time as yet to make a report on its effects, but I want to say personally that I am very much encouraged by the value and helpfulness of the use of emetin and iodagol in the treatment of pyorrhea by the general practitioner.

Dr. E. G. Parker, Goshen. I feel that our society is indeed most fortunate that the committee has seen fit to brush away the cobwebs from our minds, and refresh our memories upon the histology and functions of the soft tissues of the mouth which cover the surface of the field of our daily operations, and with which we are so constantly in touch that I am afraid we become careless and indifferent as to the important part they perform in maintaining the health and constitution of our patient, and in determining the success or failure of our operations.

The fact is, gentlemen, that the success of all our operations in dentistry depends absolutely upon the healthy condition of the soft dental tissues. Again let me emphasize the statement that our society owes a debt of gratitude to Dr. Squire for going into the A B C of the soft tissue construction of the mouth, and warning us of careless habits of abuse of those tissues into which so many of us have likely fallen.

His descriptions of the peridental membrane, bloodvessels, nerves, and gum tissue are reasonably terse, and well worth careful study on the part of each one of us, and I leave them to you to ponder upon. As the essayist has said—"The foundation for the preservation of this membrane [namely, the peridental] from injury and disease must be laid in early life." It is so essential to the normal growth and development of the vestibule of the entire system that it makes for the weal or woe of the whole life of the patient.

I do not see how anyone can disagree with the essayist in what he says about root-canal treatment. We may not all

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agree upon the details of technique in root-canal work, nor do we all employ the same agents in performing the operation, but we do all agree that sterilization and asepsis are essential. I agree with the essayist that it is most necessary to thoroughly open up the canals to view and free access. I believe we all recognize the valuable assistance of the X-ray, and hence it needs no comment at this time.

I am in thorough accord with those who advise and perform root amputation in obstinate cases of dento-alveolar abscesses with an involved area at the apex, and have had many cases that would have been failures without the operation. Sterilization and asepsis are as necessary in this work as in all other dental operations—and it is so understood, without repeating.

The essayist in touching upon emetin treatment in pyorrhea is giving us food for thought. My personal experience in pyorrhea treatment is that thorough instrumentation is necessary, and that emetin is simply one of the beneficial drugs that may be used systemically or locally to assist nature in effecting a cure.

The essayist has been concise and yet conservative in his statements throughout the paper, and I take pleasure in recommending it in its entirety to your thoughtful consideration.

Dr. Squire (closing the discussion). I would not say anything in closing, but the discussers have asked one or two questions, and I will take just a moment to answer them. In the first place I think I contradicted myself in what I said in regard to the mechanical treatment of root-canals, etc. I asked, What is the use of this discussion of amputation, etc., if in our treatment we subject the whole root-canal to infection by our method of working up cotton with the medicament upon it? Later I said that mechanical reaming was more important than medicinal treatment. I took as my authority on that subject Dr. Johnson of the Chicago College of Dental Surgery. Personally I believe that is true. This paper is not an essay; it is simply a report of the committee on some things we felt important to you to discuss.

It seemed necessary to bring up the question of the peridental membrane when all but dental operators were recognizing the importance of its protection. It seems that we as operators should appreciate the injury that we do in our operative procedures.

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Report of the Committee on Scientific Research.

By W. B. DUNNING, D.D.S., Chairman.

THE work of the current year, under the auspices of Prof. Wm. J. Gies, Columbia University, may be best indicated by quoting from an outline prepared by Professor Gies:

[1]

May 2, 1916.

Dear Dr. Dunning,—I have the honor to state herein the character of our research program under your auspices, during the past year, and also to indicate the general nature of some of the results.

In pursuance of the general plan adopted three years ago, we have continued to concentrate attention on the problem of the influence of internal secretions on the development and condition of the teeth, with special reference to the establishment of physiological standards as a foundation for projected studies of dental pathology.

(1) Two years ago we reported the dental effects, in rats, of thyro-parathyroidectomy, and also of thymectomy. The results were negative in the main.

(2) Last year we reported the results of experiments on the effects (*a*) of feeding ductless glands (in rats) and (*b*) of deficient diets (in rats and dogs). Significant preliminary results were obtained in the first series (*a*) with pineal and salivary glands and with testicle, and in the second series (*b*) with diets deficient in calcium and phosphate.

(3) This year we have proceeded along the following lines:

a. The experiments that last year yielded significant preliminary results on the effects, in rats, of ingested glands, were repeated and extended. The experiments were numerous and the analytic results are now being daily accumulated. All the data will be available by May 10th.

b. The dental effects, in mature male rats, of early castration have been studied. The experiments were numerous, and the analytic results are being rapidly accumulated. All the data will be available by May 10th.

c. The earlier experiments on thyro-parathyroidectomy (1) have been extended. The results, as before, were negative.

d. Experiments on the dental effects, in rats, of parathyroidectomy—as distinguished from *thyro*-parathyroidectomy—have been completed. We find that parathyroidectomy impairs calcification.

e. Studies of the dental effects of ingested thyroid on successive litters of rats from particular pairs of rats have been inaugurated, and will continue throughout the summer. Results indefinite thus far.

f. Studies of deficient diets, on successive litters of rats from particular pairs of rats have been begun, but may not be completed by May 12th.

g. Studies of the validity of current chemical methods for the determination of the quantities of calcium in teeth have been completed. We find that our published procedure, including McCrudden's excellent process, gives thoroughly accurate results.

h. Studies of "physiological" variations in the composition of the teeth of rats have been conducted. We have found that there is suf-

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ficient variation to require special experimental attention.

i. We have continued our study of (*a*) the passage of substances from the circulation into pulp through dentin into enamel, and of (*b*) the passage of substances from the exterior of teeth into enamel through dentin into pulp. These experiments may not be completed before May 12th. The newer results, like the preliminary findings, are positive.

j. We have begun studies of the dental effects, in rats, of toxic malnutrition. The first series of experiments will not be completed before May 12th.

k. A cage of special design and particular utility has been devised for dental experiments on rats, guinea-pigs, and small animals in general. Diagrams showing the structure of this cage will be published with our report. We may take one of them to Albany for inspection. This cage will be serviceable for other types of biological work.

In conducting this work I have enjoyed the very able and faithful assistance of Misses Hattie L. Heft and Irene Dougherty, and of Drs. E. G. Miller, Jr., and Wm. A. Perlzweig.

It will be impossible to report, orally, all the available data, at the meeting in Albany on May 12th. I shall single out, therefore, for extemporaneous presentation, our findings on the effects of (*a*) ingestion of glandular tissues, (*b*) castration, (*c*) thyro-parathyroidectomy, (*d*) and parathyroidectomy, and leave for the published report, or for the general discussion, all reference (other than casual) to our findings in the researches indicated above in sections *c* to *k* inclusive.

Awaiting the pleasure of seeing you at Albany, I am, with kindest regards,

Yours cordially,

WM. J. GIES.

With regard to expenditures, the following is quoted from Dr. Gies' report to your chairman:

[2]

The appropriation of $500 from the funds of the National Dental Association has been paid, as received, to Dr. Miller, my first assistant.

The State Society's appropriation of $1000 will not be used in its entirety because the outcome of the work last summer was such as to make it plain that it would be premature, this year, to attempt the histological examinations that will require the assistance of an expert histologist, and for which I recommend an appropriation of $500. I shall draw on you for only a total of $500, therefore, most of the assistance I have had this year being on the basis of nominal honoraria to Miss Heft and Dr. Perlzweig, and most of the expense being paid, by curtailing other work, from our departmental appropriation for research.

I recommend an appropriation equal, at least, to what it was for the current year, for it now appears that, next year, the proposed histological work will have to be done —all dependent, of course, on your presumed desire to proceed.

In explanation of the above, it will be remembered that the $1000 referred to consisted of $500 appropriated in May 1915, and $500 saved from the previous year. From this total, Dr. Gies has drawn upon the committee for $400 (Feb. 28, 1916, Wm. A. Perlzweig, $125; same date, Hattie L. Heft, $150; May 4, 1916, Wm. A. Perlzweig, $125), leaving a balance at present in the Empire Trust Company of $610, including the balance of $10 brought forward. This fund is now drawing 2 per cent.

May 9th: Check for $100, to order of bursar of Columbia University, covering last items submitted by Professor Gies. Vouchers for same to be submitted to committee in the near future. Balance on hand, May 9, 1916, $510.00.

It will further be seen that the National Dental Association Research Commission has assisted in our work to the extent of $500 for the current year, in addition to $500 contributed last year, making a total of $1000 contributed from that source.

Large items, in the way of stock sup-

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plies, have been contributed by Columbia University, in accordance with its practice for several years, and this has made possible the prosecution of our work on a scale that could not otherwise be considered.

Your committee recommends that an appropriation of $500 be made for the work of the coming year—1916–17—thereby complying with Dr. Gies' suggestion and making it possible for him to undertake the histological examinations suggested by him, but which for reasons deemed sufficient by him he has deferred from time to time.

It is hoped that the Research Commission of the National Dental Association will contribute $500 for the coming year, as it has done in the two previous years, and the chairman is now in communication with Dr. Price on this subject.

An important matter concerning the publication of the report of your committee last year is submitted for your consideration. On November 3, 1915, Dr. Gies received a letter from Dr. Edward C. Kirk, the editor of the *Dental Cosmos,* from which the following is quoted:

I am writing to say that the report (for May 1915) is so extensive and voluminous and involves such a bulk of detail that I do not feel justified in publishing it in its present form in the *Dental Cosmos.* I have submitted the question to the general manager of the company publisher of the *Cosmos,* and he fully concurs in this decision.

It is not only a question of space limitations in our magazine, but it is the presentation of a topic of this character in such elaborate detail that staggers us. Your first instalment, already in type, will occupy twenty-seven pages of *Cosmos* text, and we estimate that the succeeding instalments will require possibly double that amount of space.

Apart from these considerations we are compelled to take into account the demands made upon us by the audience of *Cosmos* readers, a considerable portion of whom object strenuously to our overweighting the *Cosmos* pages with elaborate reports of scientific research work of this character, and in the interest of our magazine I am compelled to give sympathetic attention to the desires of our *clientèle* in that respect.

I trust that you will believe me when I say that in coming to the conclusion herein specified, it is not through any lack of sympathetic interest in the work that you are doing, but I have been compelled to decide as I have stated, simply on grounds of proper expediency, having due regard to the interests of our publication.

No communication was received by your committee from the *Cosmos* office on this subject, but the result has been that your committee's report was declined for publication in the official organ of our society. Inasmuch as a large portion of our resources is contributed yearly toward the maintenance of the work of the Scientific Research Committee, and, inasmuch as it may fairly be inferred from that fact that the Dental Society of the State of New York considers Prof. Gies' work of essential value in the progress of dental science, your committee feels that the action of the *Dental Cosmos* is highly detrimental to the welfare of our society. It seems to us that, if the *Dental Cosmos* avowedly caters to a class of readers who demand popularized dental literature rather than those records which are of substantial scientific value, such a journal has ceased to be of a character suited to be intrusted with the publication of our Transactions. Furthermore, aside from the indignity implied, it would seem suicidal to continue an expenditure of $500 per year for material which will be doomed to be pigeonholed in our bound Transactions.

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Also, your committee feels very strongly that Professor Gies should not be requested to prosecute his labors with the understanding in advance that they will not be permitted to reach the scientific world at large. Your committee, therefore, protests very strongly against the action taken by the *Dental Cosmos*.

In closing this report, your committee is confident that the work of Dr. Gies, planned as it is upon such a broad foundation, and being prosecuted, though slowly, with such thoroughness in all details, cannot fail to be of lasting value in the advancement of our science. From the beginning of his work, six years ago, to the present date, Dr. Gies has contributed all the initiative and much of his personal strength for our benefit and the public welfare, for no compensation whatsoever, except the honor that such service brings upon itself; and we heartily recommend a vote of thanks to Professor Gies, his collaborators, and Columbia University, for the work of the current year.

Respectfully submitted,

WM. B. DUNNING, *Chairman*,
ARTHUR H. MERRITT.
W. RAY MONTGOMERY.

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Dental Silicate Cements in Theory and Practice.

By CHAS. C. VOELKER, D.D.S., Brooklyn.

THE present communication is the fourth of a series of papers dealing with the silicate cements in dentistry presented by the writer during the past two years, and undertaken with the object of placing before the dental profession in this country such unbiased scientific and practical information as it was possible to obtain from the literature and from correspondence with manufacturers and others interested in cements, combined with some experimental work performed by the writer, in the hope that it would aid dentists to form a better criterion of the place of the silicates in practice, and help to abolish the empiricism which until recently so largely characterized their use.

Owing to the secrecy observed by the inventors and manufacturers of most of the dental silicate cements, it has proved almost impossible for the average dentist to obtain exact data regarding their chemistry and physical characteristics, except at considerable expense of time and money for the making of investigations—with the result that very little was written about them in this country during the first ten years after they came into widespread use that would shed much light on their composition and their value as filling materials.

PREVIOUS INVESTIGATIONS.

The writings of Dr. Herman Fleck of the Colorado School of Mines, and of Dr. H. H. Johnson, Dr. W. B. Dunning, and one or two others, had given us some insight into the composition and properties of the silicates, but it became necessary to turn to the work of European investigators like Morgenstern, Rawitzer, Apfelstaedt, Richter, Feiler, W. and D. Asch, Abraham, and various others who have written exhaustively on the subject, to realize the wealth of scientific data relating to dental silicate cements which had been disseminated in Europe and of which little had been translated for the benefit of American investigators.

It is the hope of the writer that in time the silicate cements may become the object of careful systematic research in this country, under the auspices and with the encouragement and laboratory facilities of scientific bodies. If at the same time it were possible to obtain the active co-operation of inventors and manufacturers of the silicates, who possess the all-important secrets of ultimate composition, we would probably be enabled to work out still better formulæ of composition that would in time lead to the development of that ideal

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plastic filling material for which the profession has been seeking.

RESEARCH WORK URGED.

Meanwhile, it is to be hoped that more exact chemical analyses will be undertaken by dentists or by chemists who may be interested in dental cement chemistry, in order to establish definitely the ultimate chemical composition of the silicate powders and liquids. This work will have to be undertaken by individuals until the profession has at its disposal a board of pharmacy and chemistry in connection with the National Dental Association which shall both analyze and standardize the materials we use, and shall insist that all such materials and drugs used by its members shall be labeled with their exact constituents, as is now done by the American Medical Association under its recently instituted "propaganda for reform."

Since various trade designations have been applied to the dental silicate cements, such as chemical porcelain, synthetic porcelain, artificial enamel, plastic porcelain, and porcelain cement, which give us no clue regarding their chemical composition or other characteristics, and often lead both dentists and laity astray as to their true nature, let us first inquire into the composition of the silicate cements, and see in what way they differ from porcelain as known to us in the porcelain inlay.

CHEMICAL COMPOSITION OF SILICATES.

The silicate cement powders as supplied to us by the manufacturers are all synthetic preparations, *i.e.* they are combinations or syntheses of chemical compounds such as oxids, silicates, aluminates, fluorids, borates, etc., of certain of the elements, such as calcium, aluminum, silicon, beryllium, sodium, magnesium, etc. The liquids are more or less dilute solutions of orthophosphoric acid, containing modifiers such as the phosphates of aluminum, zinc, strontium, etc., and one of them I have been informed by its inventor contained hydrofluo-silicic acid.

When the powder and liquid of any of these synthetic compounds are mixed together to form a cement, and this is inserted into a cavity to act as a filling under the name of porcelain filling, to so misname it constitutes a fraud on the public, and has served to bring these valuable filling materials into some disrepute. Therefore a mix of silicate cement used as a filling material should be called a silicate filling, to distinguish it clearly from a porcelain inlay on the one hand and an oxyphosphate filling on the other—although it is true that the ingredients of the silicate powders are allied in chemical composition to the ingredients of the porcelain powders before fusing the latter into the porcelain inlay; and it is furthermore true that the silicates are to be looked upon as being largely of the oxyphosphate type of cements, because of the liquid element used.

Of the thirty or more silicate cements which have been offered to the profession since about 1890, the following five are mentioned as being used now almost exclusively in this country, namely, Ascher's New Enamel, De Trey's Synthetic Porcelain, Ames' Berylite, New Harvardid, and Abraham's Translucin. The writer's clinical experience has been limited to the first three, but experimental work has been carried out with all of them to determine relative degrees

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of solubility, heat evolved in setting, reaction to staining reagents, translucence, microscopic appearance, etc.

In taking up the study of the dental silicate cements, three questions at once present themselves to the mind:

(1) How are the powders and liquids prepared for our use?

(2) What does chemical analysis show these powders and liquids to contain?

(3) What is the composition and nature of the mixture of the powder and the liquid, *i.e.* of the cement itself, after it has set?

ASCHER'S ARTIFICIAL ENAMEL.

In order to answer the first question satisfactorily I must perforce have recourse once more to the detailed patent specifications of Ascher's Artificial Enamel as received from the German Patent-office, because other sources of information regarding manufacturing technique are not available. They will serve to illustrate the general method followed:

Sodium silicate is added to a solution of basic beryllium nitrate and the precipitate formed is allowed to settle, left in water for a time, and is then filtered, washed carefully, dried, and heated to low redness. This produces a chemical compound made up of silica (silicon dioxid or silicic anhydrid), SiO_2, combined with a basic beryllium salt, BeO, and may be expressed by the empirical formula $SiO_2.BeO$. To this silicate of beryllium is added alumina (aluminum dioxid) or glass (a "solid solution" of silicates, aluminates, borates, and oxids) and the ordinary porcelain colors to produce the various shades. The mixture is probably fused again to more intimately combine the ingredients, and is then finely pulverized and bottled for use. The liquid of Ascher's product is given as being about a 50 per cent. solution of orthophosphoric acid in which aluminum phosphate is dissolved almost to the point of saturation, and to which a slight amount of zinc or strontium phosphate is also added.

Thus we see the reason for naming these cements silicates to distinguish them from the older types of oxyphosphates. But since they contain alumina to a large extent also, they might with equal propriety be named aluminate cements.

ABRAHAM'S TRANSLUCIN.

This is exemplified in the translucent cement known as Abraham's Translucin, in which alumina is the basic material employed in manufacture, with probably only a very small proportion of silica. The alumina is heated to about 1250° C. with fluorids, in order, as the inventor claims, to lower and control the fusing-point necessary to render the alumina more insoluble. Abraham uses the mineral bauxite, a hydrated oxid of aluminum derived from the decomposition of rocks containing aluminum silicate, from which to obtain the alumina he uses. He suggests as a better name for the silicate cements the term aluminum-phosphate cements, as describing them more satisfactorily from a chemical standpoint after the phosphates have been precipitated by the mixing of the powder and liquid, and the mass has set.

AMES' BERYLITE.

The silicate cement known as Berylite, invented by Dr. W. V-B. Ames, is called by him a "siliceous cement," and also

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"a synthetic feldspar modified by rare earths." He writes me that the powder of his cement is composed of basic silicates of calcium and aluminum, aluminates, and rare earths combined at so high a heat that an indescribably complex compound results. An analysis of Berylite which was sent to me showed it to contain silicon dioxid, calcium oxid, aluminum oxid, and sodium oxid, all easily obtainable and inexpensive substances, but it did not show the presence of the rare earths mentioned. Perhaps further and more delicate analyses would reveal them. The liquid of this cement was found to be a modified phosphoric acid solution containing hydrofluo-silicic acid, although Dr. Ames tells me that the latter is no longer used in his later formula.

SYNTHETIC PORCELAIN.

Regarding the manufacture of the silicate cement known as Synthetic Porcelain, the manufacturers have been unwilling to give me even the slightest information regarding its composition or method of manufacture, and I have had to rely upon an ultimate analysis for the determination of its chemical composition. This analysis showed the powder to contain silicon dioxid, aluminum oxid, phosphorus pentoxid, calcium oxid, and sodium oxid. The liquid was a modified phosphoric acid solution containing zinc and aluminum phosphates.

NEW HARVARDID.

An analysis of the silicate cement known as New Harvardid, published by a German investigator in 1913, showed a chemical composition as follows: The powder consisted of—

	Per cent.
Silica (SiO_2),	40.26
Alumina (Al_2O_3),	50.62
Lime (CaO),	5.00
Magnesia (MgO),	.51
Potassium and sodium oxids.	1.08

You will note by this last analysis the low percentage of alkaline oxid in this product. On the other hand, as pointed out in a former paper by the writer, some of the silicate cement powders show as much as 13 to 16 per cent. of alkaline salts. These are introduced with the original ingredients before fusing, to act as catalyzers to help bring about a more perfect fusion of the refractory substances, and to lower the fusing temperature. It would seem to me to be better, if possible, to avoid this large addition of alkaline flux, since, when the powder of the silicate cement is mixed with the acid liquid, alkaline phosphates may be formed which would be soluble in the saliva and be leached out in time. I shall show later on in this paper that, in spite of claims to the contrary, silicate cements are soluble to a considerable extent.

COMPOSITION OF THE MIX.

Regarding the third question, of the composition of the set and hardened cement, we may state as the consensus of opinion of those who have given the silicates detailed study, both here and abroad, that a silicate mix contains calcium and aluminum or beryllium phosphates admixed with silicates, aluminates, fluorids, and other compounds, and that chemically they are allied to the older type of oxyphosphate cements, especially the zinc oxyphosphates. In the latter we have a reaction analogous to the following, assuming for the sake of simplicity that the powder is only

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zinc oxid. and the liquid unmodified ortho-phosphoric acid:

$$4ZnO + 2H_3PO_4 = Zn_3(PO_4)_2.ZnO + 3H_2O.$$

In other words, the older types of oxyphosphate cements are chemico-mechanical mixtures of zinc phosphate and zinc oxid, no true chemical compounds known as oxyphosphates and expressible by means of exact chemical formulæ being recognized in chemical terminology.

I am fortunately able to give you the opinion on this matter of Dr. Paul Steenbock of Berlin, the inventor of Ascher's Artificial Enamel, as contained in a communication received from him on the subject. He says:

The result of the setting of the older zinc oxyphosphate cements was a solid body made up of phosphates which enveloped the free oxid particles of the powder. But zinc oxid and the oxids used together with it, such as magnesium oxid, calcium oxid, and aluminum oxid, in the forms in which they were employed, were not translucent, consequently they had either to be discarded or prepared in some other form. Of the pure oxids, those of aluminum, beryllium, and magnesium were capable of being prepared in the translucent form, but they gave trouble with regard to the complete fixing of the acid. We therefore resolved to employ readily decomposable compounds of the oxids instead of the oxids themselves. These compounds had to be translucent, easily decomposable by the cement acids, and had to furnish insoluble translucent decomposition products. Of the possible compounds available, such as the borates, basic phosphates, fluorids, etc., the silicates proved to be the most suitable. Instead of the simple oxids we therefore combined silicic acid compounds of the oxids with the old cement liquids—that is to say, we put up the older cements in a new form. I was therefore not a little astonished when everybody fell to imagining that there must be some secret behind the new cements; yet we had done nothing more than to conduct a well-known process along lines which brought about a definite physical effect. Hence *the silicate cements must be described, as regards their chemistry, as identical with the older oxyphosphate cements*, with the sole difference that in the oxyphosphate cements the fixing of the acid takes place rather more quickly initially, and that the silicate cements require close observance of the mixing ratio. The hardened silicate cements are mixtures of phosphates, silicates, and silicic acid.

In the light of such a plain statement by a manufacturer and inventor, in contrast to the secrecy that is maintained by others, I feel that the profession is indebted to Dr. Steenbock for thus giving us freely of his chemical knowledge of the silicates, and helping to raise them from out of the slough of empiricism which until recently had engulfed them.

PHYSICAL CHARACTERISTICS.

Having thus briefly presented for your consideration what knowledge of the chemical makeup of the silicate cement powders and liquids I have been able to gather, let us turn to a consideration of certain physical characteristics of these cement bodies that may be of interest to the dentist in his daily use of them. In doing this, I should like to take as my norm or starting-point the twelve properties which the late Dr. W. D. Miller set down as being essential in an ideal filling material, as follows: Hardness, unchangeability or chemical indestructibility, constancy of form and volume, low-heat conductivity, color like natural teeth, absence of deleterious action on tissues and health, easy manipulation, minimum sensitiveness to moisture, adhesiveness, antiseptic properties, and easy removal, if necessary.

TESTS FOR HARDNESS.

Concerning hardness, the different silicates vary somewhat, both in the rapid-

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ity with which they may be finished down after setting and in crushing strength. Berylite and Ascher's Enamel show about the same resistance to abrasive strips and disks, whereas Synthetic Porcelain is much more easily finished down and polished than either of the others. In order to make the solubility tests which follow, I made rather large mixes of the different silicates, which were shaped into the form of pellets averaging in size about a quarter of an inch in diameter. Berylite was very difficult to pulverize, being exceedingly hard; Ascher's Enamel and Harvardid were about equal in crushing strength under the pestle; and Synthetic Porcelain proved easiest of the four to reduce. Crushing tests with recording machines should be undertaken by researchers to work out the comparative hardness of these materials.

UNCHANGEABILITY AND CONSTANCY OF FORM.

The next two properties, namely, unchangeability (or chemical indestructibility) and constancy of form and volume, may be considered under one head, which for convenience we will call insolubility. My experiments in this direction were made with the object of confirming or combating certain positive statements appearing in advertising literature of the silicate cements regarding their insolubility.

TESTS FOR SOLUBILITY.

Solubility tests heretofore published seem to have been carried out on rather large pellets of mixed cements, which naturally presented but little surface to the action of the fluids used in testing, and could therefore not be considered confirmative of insolubility when they showed no apparent loss in weight. I decided to make my tests on powdered mixes, which would permit the fluids used to exert their utmost solvent effects on the greatest possible area of tested material.

Knowing the objections that would inevitably be raised to the use of saliva or salivary counterfeits in test tube experiments, I decided to make all my tests first in water, that being the main constituent of the saliva in any case, and probably the chief factor in the dissolution of the silicates, especially in the presence of acid in the mouth; and to follow the first with a second series of experiments, using water acidulated with a small percentage of lactic acid, which is the principal acid found in the mouth. All weighings were made with a chemical balance sensitive to one-tenth of one milligram. The water used was distilled. The lactic acid employed was Merck's chemically pure. In order to reduce the factor of error as much as possible, all filter papers used were separately tared. Duplicate tests were always carried out, using the same batch of mixed and powdered cement, since I had found that tests made upon mixes which had been prepared at different times gave somewhat different results. When weighings showed a divergence of over 1 per cent. between duplicate tests, using the same material at the same time and under exactly the same conditions, the test was repeated for greater accuracy.

METHOD OF MAKING EXPERIMENTS FOR SOLUBILITY.

The method of making these experiments was as follows: 500 milligrams of the powdered cement—which had been

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mixed and allowed to set for four days before pulverizing—was placed in a test tube and covered in the first series of experiments with 10 cc. of distilled water, and in the second series with distilled water containing 1 per cent. of lactic acid. All tests were made in duplicate or more, and marked *a, b, c,* etc. The cements used were Ascher's New Enamel, De Trey's Synthetic Porcelain, Ames' Berylite, and New Harvardid. The test tubes were stoppered and the contents shaken up at intervals during the following forty-eight hours, being subjected to a constant temperature of 98° F. during that period. After cooling to the room temperature of about 70° the contents of the test tubes were filtered through tared filters, washed carefully, and the filter papers and contents dried and weighed. The results of these tests were as follows:

Series A.

(Using distilled water only.)

Ascher's New Enamel:

Loss in *a* was 0.0268 gram
" " *b* " 0.0313 "
" " *c* " 0.0288 "

—giving an average loss of 29 mgm. in 500, or 5.8 per cent.

De Trey's Synthetic Porcelain:

Loss in *a* was 0.0316 gram
" " *b* " 0.0313 "
" " *c* " 0.0327 "

—showing an average loss of 32 mgm. in 500, or 6.4 per cent.

Ames' Berylite:

Loss in *a* was 0.0466 gram
" " *b* " 0.0488 "
" " *c* " 0.0482 "
" " *d* " 0.0462 "

—showing an average loss of 47.4 mgm. in 500, or 9.5 per cent.

New Harvardid:

Loss in *a* was 0.0723 gram
" " *b* " 0.0725 "
" " *c* " 0.0752 "

—showing an average loss of 73.3 mgm. in 500, or 14.6 per cent.

For comparison, I append duplicate tests made on ordinary Harvard Cement, oxyphosphate type, as follows:

Loss in *a* was 0.0274 gram
" " *b* " 0.0273 "

—or an average loss of 27 mgm. in 500, or 5.5 per cent., showing that ordinary Harvard Cement is apparently less soluble in distilled water than the silicate cements.

Series B.

(Using 1 per cent. lactic acid solution.)

Ascher's New Enamel:

Loss in *a* was 0.0760 gram
" " *b* " 0.0738 "
" " *c* " 0.0768 "

—showing an average loss of 75.5 mgm. in 500, or 15.1 per cent.

De Trey's Synthetic Porcelain:

Loss in *a* was 0.0575 gram
" " *b* " 0.0565 "
" " *c* " 0.0513 "

—showing an average loss of 55.1 mgm. in 500, or 11 per cent.

Ames' Berylite:

Loss in *a* was 0.0633 gram
" " *b* " 0.0638 "

—showing an average loss of 63.5 mgm. in 500, or 12.7 per cent.

New Harvardid:

Loss in *a* was 0.1134 gram
" " *b* " 0.1094 "
" " *c* " 0.1134 "

—showing an average loss of 112 mgm. in 500, or 22.4 per cent.

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For comparison, again, I give duplicate tests of Harvard Cement, as follows:

Loss in *a* was 0.0686 gram
" " *b* " 0.0739 "

—showing an average loss of 71 mgm. in 500, or 14.2 per cent.

DEDUCTIONS FROM RESULTS OF TESTS FOR SOLUBILITY.

We see from the results of these tests that the silicates cannot be called insoluble, although the percentage of solubility in water is not great when we take into consideration the severity of the tests; but our attention should be directed particularly toward the results of the tests with 1 per cent. lactic acid solution. The striking increase in solubility shown in the second series of tests, using a comparatively weak organic acid like lactic, which nevertheless is so often present in the mouth, and is supposed to be responsible for the decalcification of the enamel and to be the incipient cause of caries, gives us food for thought. If the publication of my findings in this series of tests does nothing more than to bring home to those using the silicate cements that it is necessary to keep the mouth free from acid at all times, and strengthen the insistence on mouth hygiene so necessary to the practice of real preventive dentistry if it is to be anything more than a name, then I shall feel that the work entailed in carrying out these tests will have been worth while. My observation of cases in practice has proved to me that the silicates will be subject to little dissolution in mouths in which correct methods of mouth hygiene are followed by the patient, whereas in mouths subject to acidity and erosion, such dissolution does occur.

With the propaganda now going on for the use of acid mouth-washes, containing large quantities of acetic or citric acid, and which is opposed to the older therapy, which insisted on the use of alkaline washes, we are confronted with one of two procedures: We must either use the acid washes in the prophylaxis of dental caries—as recently advocated but not yet sufficiently proved as being preferable to the older method and to general detergent procedures—and give up the use of the silicate cements on account of the solvent action of such acid washes on them; or, we must make use of these valuable filling materials and keep the mouth acid-free by methods of mouth hygiene adapted to that end.

EXPANSION AND CONTRACTION.

In an ideal cement filling, expansion and contraction should not occur. The recurrence of decay around fillings is probably chiefly due to the fact that a perfect and permanently water-tight filling is practically impossible of attainment with any of our present-day filling materials. All of our cements have a tendency to contract after setting. Dr. Proell of Koenigsburg made exhaustive experiments along this line, and came to the conclusion that silicate fillings after they had once set should be kept in contact with the saliva, or at least not be allowed to dry out completely. An explanation for the chemical and physical reasons of this will be given when I refer to the colloidal nature of the silicate cements.

HEAT CONDUCTIVITY.

With respect to heat conductivity, the silicate cements are almost perfect in-

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sulators against thermal shock, provided that they themselves do not cause shock on account of the heat generated in setting. The old silicate known as Archite, for example, will in setting generate sufficient heat to soften Kerr's Perfection modeling compound to a condition in which it will be plastic enough for taking an impression. Experiments made by various investigators, including the present writer, have shown that the temperature of setting of the various silicates placed on the market during the past eleven years ranged from 84° to 122° F. The silicate cements mentioned in this paper as being in use at the present time are safe as regards heat development, since none of them have setting temperatures much beyond 90° F. Hence they also will not set too rapidly after mixing—a fault common in some of the older silicates.

COLOR.

Little exception can be taken to the silicate cements as regards their close resemblance to tooth structure and color when inserted as fillings, although some of those under consideration excel others in this particular. The readiness with which tooth colors can be matched with silicates is mostly due to the translucence which distinguishes these cements. Dr. Steenbock claims that the translucence of these cements is largely due to the amorphous precipitation of the phosphates in the silicate mix, which is contrary to the strongly prevalent idea that a silicate mix is entirely crystalline in structure. He says that these phosphates, when precipitated from aqueous solutions, are highly translucent, especially in the amorphous form. It was necessary, therefore, in making up the powder of Ascher's Enamel, to have the free powder particles translucent. The manner of doing this I have given above. It is the amorphous precipitation of these phosphates that appears to give the highest degree of translucence, the amorphous state being that of optical homogeneousness. In crystalline mixtures there is very little translucence, owing to the diverse arrangement of individual crystals and the optical differences between crystals of different substances. The universal property of all kinds of glass is that of possessing an amorphous structure, vitreous bodies being regarded as typical of solids lacking definite structure. Ordinary window glass is transparent, owing to its amorphous and completely vitrified structure; crystalline glass is hardly translucent, owing to some of the ingredients being allowed to remain in the crystalline condition instead of being completely fused or vitrified. We know that zinc oxid forms a crystalline phosphate, while lime, aluminum, and beryllium oxid form amorphous phosphates. Thus the three latter are preferred in the preparation of the silicate cements. I have not been able to find definitely crystalline substances in either the unmixed or powdered mixed cements.

SILICATE CEMENT FILLINGS COMPARED WITH PORCELAIN INLAYS.

While on this topic of translucence, it might be well to make certain comparisons between silicate cement fillings and porcelain inlays. The main reason for the use of porcelain over gold is an esthetic one, probably 90 per cent. of porcelain inlays being placed in the front of the mouth. Nothing more perfect than a well-made porcelain restoration

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could be conceived as a substitute for lost dental tissue, provided it were possible to maintain the inlay in that condition indefinitely. But we are faced with the difficult problem of a cement line, which up to the present time has not been solved by any practicable method, and by the necessity of depending almost entirely upon oxyphosphate cement for the adhesion of the inlay to the cavity walls, which interferes with translucence, color effect, and durability, and besides, often prevents the inlay from going to place properly. Hence we are warranted in making the general statement that a porcelain inlay is only as durable as the cement which holds it in place. This fact has led many of us who continue to use the porcelain inlay to warn our patients that after the lapse of a certain period of time such inlays may have to be re-cemented, owing to the dissolution of the holding cement. For the restoration of large corners on the anterior teeth, especially, the porcelain inlay will probably continue to be used as frequently as heretofore, until the lapse of time shall show that silicate restorations are sufficiently durable to be used with safety in such cases. But in the places where they are indicated, experience has shown that the silicate fillings bear favorable comparison with the porcelain inlay from an esthetic point of view; that it is as easy to repair or to replace a silicate filling as it is to re-cement an inlay; that the silicate filling is about as durable as the average porcelain inlay up to the time that such inlay needs re-cementation or replacement—let us say, from two to ten years—and that, when a silicate filling does wash out or need replacement for any reason, there is usually very little recurrent caries under it, and little more loss of tooth structure, probably due to the same germicidal properties as have been shown by the researches of Smirnow and Poetschke to be possessed by the oxyphosphate cements. This observation I feel sure you all have made with respect to oxyphosphate fillings and fillings cemented in, or which have been lined with cement.

ABSENCE OF DELETERIOUS ACTION ON TISSUES.

The ingredients of the present-day silicate cements may be considered as being devoid of deleterious action on tooth substance or upon the general health, provided they are used rationally and only where they are indicated. The charge that the first silicate cements contained arsenic or other pulp-devitalizing ingredients as impurities has not been sufficiently substantiated to be seriously considered. Had the zinc oxyphosphate cements been used as indiscriminately in anterior teeth, or even in deep cavities in other teeth, as the silicates were when first introduced, we should probably have had much the same objections brought against them as having caused the death of pulps. In fact, the literature of twenty to thirty years ago contains much discussion on the subject. It is probably the phosphoric acid content of the mixed cement, whether silicate or oxyphosphate, that has not been completely neutralized that is productive of pulp irritation. Hence in deep cavities a non-irritating cavity lining, such as Fletcher's Artificial Dentin, should be used under all classes of cements. The pulps of teeth have died and will probably continue to die under all kinds of filling materials, as well as in teeth that have never apparently been affected by caries or pyorrhea. In the

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very few deaths of pulps which have occurred in my practice during the past eleven years, out of a total of some 1300 silicate fillings, I have found that they were due more to failure to remove such pulps, probably already infected by the progress of caries, than to any inherent fault of the filling material used.

Discoloration of the teeth in which silicate fillings are placed should not occur. Should it happen, it is usually due to faulty manipulation, to the use of the wrong kind of instruments, or to the presence of foreign substances contaminating the liquids or powders and forming dark sulfids when exposed to saliva. If the cement ingredients are left exposed to the fumes of dental drugs—as tincture of iodin, for example—such discoloration may be brought about. Therefore the containers should be kept well stoppered in a separate compartment away from other chemicals or drugs.

EASE OF MANIPULATION.

We may state, with regard to ease of manipulation, that if correct technique in mixing and careful manipulative procedures regarding insertion of the filling be observed, little difficulty will be experienced by dentists in handling these cements. But minute attention to detail is as necessary here as for any other class of filling material, since in some ways silicate cement is the most sensitive material with which we have to deal.

SENSITIVENESS TO MOISTURE.

The question of sensitiveness to moisture is a broad one, and gives much opportunity for discussion. I have already answered the question from one viewpoint in the report of my work on the solubility of these cements as given above. But the small surface of filling exposed to the action of the saliva, as compared with the relatively huge surface exposed in the powdered mixes that were tested, makes it probable that the rate of dissolution in the mouth, provided it be kept acid-free, would be very slow. Fillings of silicate cement examined after several years of service have shown practically no change in volume perceptible to the eye.

COLLOIDAL NATURE OF SILICATE CEMENTS.

There is another factor of extreme importance in regard to the action of moisture on silicate cement fillings, and that is that immersion in water seems to be essential to their durability, irrespective of any solvent action which may occur from such immersion. Like the other silicate cements of commerce, such as Portland cement or the so-called hydraulic cements, the dental silicate cements when mixed and set are supposed to contain colloids—or "gels," as they are called in technical language—on the continuous hydration of which depends the integrity of the set cement. Dr. Steenbock has stated that the amorphous precipitation of the phosphates in a mix of silicate cement leads to the formation of these gelatinous or colloidal substances. Silicic acid and also aluminum silicate, combined with water, are precipitated in the colloidal form, and mix with the phosphatic precipitates, solidifying after the cement liquid is used up in the mixing. That these colloids are capable of becoming hydrated has been proved by the fundamental work of Graham, the process of "gelatinous hydration" being regarded by him as a

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process as truly chemical as crystalline hydration. His views were later confirmed by Van Bemmelen, who gave the name hydrogels to these gelatinous hydrates. It was the introduction of the colloidal theory into Portland cement chemistry by W. Michaëlis in 1893 that enabled chemists to form a clear picture of the nature of the setting process. The hardened colloids, mainly silicic acid and the colloidal hydro-silicates of Michaëlis, are insoluble in water; but if they become desiccated there is considerable contraction of volume (proved by the experiments of Proell on dental silicates, referred to above), which later results in a cracking of the mass as the water disappears by evaporation. This I have confirmed by observing thin mixes of silicate cements under the microscope during several days. It is probably for this reason that the silicate cement known as Protesyn, used for reproducing the gum color on plates, must be kept constantly wet in order to prevent its cracking and breaking away. Another factor which seems to argue in favor of the colloidal nature of at least a portion of the silicate mix is the fact, as pointed out by the writer in a former paper, that these cements will stain with the ordinary eosin dyes in dilute solution. Desch, in his work on hydraulic cement chemistry, showed that the colloidal elements in a mix of Portland cement will stain with these dyes; and my experiments with five different dental cements showed that they will take up the stain very readily. Such staining does not, however, necessarily indicate porosity of the material, as has been claimed, since mixes of cement pressed between glass slides to a thinness of one one-hundredth of an inch and showing a dense, mirror-like surface, stain with the same facility as rough sections not subjected to pressure.

ADHESIVENESS.

With respect to adhesiveness, the silicates when compared to the ordinary oxyphosphates show very little of this property. It is therefore necessary to undercut cavities as for gold or amalgam and to make use of metal pins or a layer of oxyphosphate into which the silicate material can be pressed, for greater safety when using them for corner or contour restorations. The only exception to the low adhesiveness characteristic of the silicates which I have noted is in the case of Berylite, which in working seems to be more adhesive although less translucent than others. Whether or not this quality is maintained for any considerable length of time after the cement has set has yet to be shown by more extended clinical experience and reports of those who have had success with it over a number of years.

In his discussion of a paper presented some time ago by the writer before the Ohio State Dental Society, Dr. George T. Fette of Cincinnati said, regarding adhesiveness: "The absence of adhesiveness in our silicates, I think, is easily explained from their colloid condition. Investigators in colloid chemistry tell us that hydrogels, or colloid jellies, extrude or squeeze out a solution which is more dilute than the general body of the liquid phase during gelatination, or in other words, during the setting of the silicates. These dilute droplets coming to the surface of the entire 'gel' must prevent adhesion."

It would lead us too far afield to enter upon the discussion of the relative antiseptic properties exhibited by the silicates, although the writer has no doubt

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that they will compare very favorably in this respect with the zinc oxyphosphates. But no research work, so far as I know, has yet been done in this direction, and I can only refer you to the recent work of Smirnow of New Haven, and Poetschke of Philadelphia, for interesting data on the germicidal properties of the dental cements of the older types.

Neither will it be necessary to discuss Miller's last essential property of an ideal filling material, *i.e.* easy removal, if necessary. I have found that the silicates are more easily removed than the ordinary oxyphosphates, probably on account of less tendency to clogging of the burs used for the purpose.

CAUSES OF FAILURES WITH SILICATE FILLINGS.

Before describing in outline the technique of manipulation, let us consider for a moment the causes that have in the past been noted as producing failures with the silicate fillings—viz: Omission to use the rubber dam to produce perfect dryness; use of steel, German silver, aluminum or other metallic instruments which corrode under the action of the cement liquid and when used in mixing lose some of their substance, which becomes incorporated with the mix, thus causing discoloration; mixing the cement too thick or too near the setting-point, making correct manipulation impossible; mixing too thin and thus permitting an excess of acidity and incomplete neutralization of the acid, tending to cause irritation of the dentin and of the pulp, slow setting of the mix, and a tendency to porosity and dissolution; the use of vaselin or other oleaginous substances with which to lubricate the instruments used for inserting the cement; the access of moisture before the cement had firmly set; the lack of correct cavity preparation and especially the non-removal of all carious dentin; dependence upon the slight adhesiveness of the silicates rather than undercutting the cavities sufficiently; desiccation of the tooth in drying the cavity, with consequent irritation from the hot-air syringe, thus facilitating the entrance of some of the acid portion of the cement into the tubules of the dentin; failure to protect the pulp in deep cavities with an impervious cavity lining; and lastly, but perhaps most important, the failure to maintain a hygienic condition of the mouth at all times, with freedom from the organic acids which have such a deleterious effect on cements.

TECHNIQUE OF MANIPULATION.

The technique of manipulation varies somewhat with each different brand of silicate cement, and I have advised those desirous of learning the best method for the particular one they may desire to employ, to follow to the letter, at first, the instructions given in the literature accompanying the package of cement, and also to watch the manipulation of mixing, etc., of expert demonstrators of that product. The following general directions may be of service, however:

After the cavity has been prepared, with undercuts and without the margins being beveled, it should first be lined, if necessary, with a cavity lining, non-irritant and impervious. The powder and the liquid in the proper proportions are placed on a clean slab sufficiently long and broad to allow correct spatulation and sufficiently bulky to permit considerable pressure being used without causing the slab to move while mixing. Agate slabs are best, because of their hardness and resistance to the hard powder of the

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cement. Usually two to three times the bulk of powder is required for each drop of the liquid used. The latter is placed on the slab a short distance from the nearest mass of powder by means of a small pipet or glass rod. Two or three drops are sufficient for even the largest fillings where silicate cements are indicated. The powder may be divided for convenience into several portions on the slab.

In mixing, a properly shaped spatula of agate having rounded edges should be used, and it should be strong enough to resist the quite heavy pressure needed in mixing silicate cements. Spatulas of bone, ivory, or metal tend to contaminate the mix, since they will not resist the hard particles of the cement powders. About one and one-half to twice the bulk of powder in proportion to the amount of liquid to be used is rapidly drawn into the liquid and spatulated with a rotary motion, the spatula being flat on the slab and the amount of rotation being confined within the space of less than one inch. When it is thoroughly spatulated, successively smaller amounts of the powder are added until the mass becomes sticky. Before adding each new portion of powder the mass already spatulated should be scraped from the slab with a sweep of the spatula lengthwise of the slab and replaced with a to-and-fro rocking motion of the spatula, thus thoroughly incorporating the powder with the liquid until a homogeneous mass is obtained. The point of proper consistence is reached when the mix has a tendency to follow the spatula when it is raised from the slab, forming cone-shaped masses but remaining sticking to the slab, and when it does not settle down again into a rounded mass.

In the insertion of the filling, the main point is to work rapidly so that it will be in place before the initial set of the mix has proceeded very far. Only tantalum, tortoiseshell, or other non-corrodible instruments should be used. The first portion of cement is placed in the cavity and condensed to the margins, working from the center outwardly. The middle portion is then placed in under considerable pressure, and a piece of thin celluloid or glazed linen strip may be placed over the filling, and evenly distributed light pressure applied by holding the strip against the filling, care being taken that the strip does not buckle and that the contour of the filling does not become flattened. This procedure is specially applicable to approximal fillings. By this time the setting of the mix is quite well advanced, and here I would caution against burnishing over the strip, as this tends to break up the hardened surface of the mass. The strip should be held, with the fingers, firmly against the filling for about three minutes until the initial set has taken place. Then the cement should be allowed to harden for from ten to fifteen minutes longer before the finishing and polishing are done. A little melted cocoa-butter may be applied to the surface of the filling after it has hardened, just after the strip is removed, since it is said to prevent the evaporation of water vapor from the setting mass. About twenty minutes after completing the insertion of the filling it should be finished with the rubber dam in place, if possible. If this be not feasible, the unfinished filling is coated with copal-ether varnish, the rubber dam removed, and the filling finished at a subsequent time, after complete setting has taken place. The finishing is done with fine strips and disks lubricated with cocoa-butter to

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prevent undue friction; and when finishing at the same sitting as the insertion of the filling, the filling should be coated with varnish before the rubber dam is removed.

In this paper I have endeavored to give you a concrete picture of the nature of the silicates and their place in dentistry, presenting in outline concerning these materials what has been discovered by investigators or given to us by those holding the ultimate secrets of their composition and characteristics. Volumes could be and indeed have been written on the subject of the silicates, such as the voluminous study of them made by Drs. W. and D. Asch, under the title "The Silicates in Chemistry and Commerce"; yet the field for the researcher is a wide one, and many truths are still to be discovered before the ideal silicate filling is possible. As Dr. S. G. Perry said years ago: "We will strike something some day that will be like the rising of the sun. As a profession we have not been studying this question of the plastics as we should have done. It will have to be studied in the laboratory and more earnestly than heretofore before we get the ideal material; but it will be found one of these days, and then the incompatibility of gold will be talked of no longer, nor will the appearance of gold be the shock to the community that it is today."

CONCLUSIONS.

Let us now briefly summarize our conclusions regarding the place of the silicate cements in dental practice.

They have largely taken the place of gold fillings and of porcelain inlays in simple approximal, buccal, labial, and lingual cavities, especially in the anterior teeth. On the occlusal surfaces of bicuspids and molars, and even on the incisal edges of the teeth, they may often be used with good results. In cases where gutta-percha and oxyphosphate fillings were used formerly as more or less temporary expedients, or where inexpensive fillings were required, the silicates often give better results because of their greater durability and only slightly greater expense to the patient. They must, however, be used with great circumspection in compound cavities or for the restoration of contours, such as the incisal corners of anterior teeth and approximo-occlusal restorations. In such cases the use of reinforcing materials, such as metallic pins and more adhesive cement, is indicated.

The ease of preparation of the cavity and insertion of the filling, the avoidance of the pain and loss of sound tooth structure so often associated with the use of porcelain inlays, as well as the uncertainty as to the permanence of the latter, and the greater esthetic effect of the silicate fillings over gold, combined with a much slighter strain on the purse-strings particularly appealing to those in moderate circumstances, have proved decisive factors in popularizing this class of fillings with the intelligent laity—even though such fillings cannot yet be called permanent in the loose sense in which that term is applied to gold and porcelain, and in spite of the fact that silicate fillings fail at times and have to be replaced like other filling materials. We can only approximate the ideal as yet.

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DISCUSSION.

Dr. W. D. Tracy, New York. The admirable essay of Dr. Voelker's on "Dental Silicate Cements in Theory and Practice" has been read by me with much interest and much profit. It is a surprising fact that filling materials of so much importance as are the dental silicate cements should have received so little attention at the hands of research workers, and so little mention by our scientific writers here in America.

The essayist expresses the hope that more exact chemical analyses of the various silicates may some time be made under the auspices of the National Dental Association, in order that the best formula may be adopted and put into the hands of the profession to be used with an intelligent understanding of the chemical as well as the physical characteristics of the material.

In this hope that the National Dental Association may some day have adequate facilities for making a scientific study of all our abstruse problems, I am sure almost all of us heartily join with the essayist. Until that day arrives, however, let us be thankful to those who give of their time and energy to make experiments and to record the results of their investigations and give to the profession the results of their experience.

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To the progressive mind in dentistry it is always a satisfaction to have absolute knowledge of the chemical as well as the physical nature of the materials being used in daily practice, and I am sure that the day will come when all such information will be available for the man who wants it.

In regard to the silicate cements, however, I believe that most of us have been using them simply as materials that were good substitutes for porcelain, not knowing—and many not caring—that the powder contained sodium silicate and basic beryllium nitrate, or that orthophosphoric acid was modified with the phosphate of aluminum or hydrofluosilicic acid. While the successful use of the material may not be dependent upon a thorough knowledge of its constituents, it is desirable that we should know and understand its composition. It is not so many years ago that these silicate cements were accused of being dangerous to use because of their large arsenic content, but, as shown in the paper just read, pulp devitalization occurring under silicate cement fillings is due to other definite and well-understood causes, and not to the presence of arsenic. This incident is noted simply to show how easily the dentist may be misled when his use of a material is entirely empirical, and how he would have looked for other causes for his devitalized pulps had he had a definite knowledge of the chemistry of the material he was using.

It is impossible for me to discuss the details of Dr. Voelker's experiments, either chemical or physical, as that would really mean the preparation of another essay, but a few of the points brought out may be commented upon, I trust, without too much consumption of time. The abuse of the confidence of the patient on the part of some dentists who have represented the silicate cement fillings as being identical with baked porcelain inlays, and claiming that they had a "patent way" of inserting porcelain quickly, is to be deplored. The dentist who would so misrepresent facts is not limited by silicate cements or any other material thing; he is simply lacking in the essential principles of honesty, and outside of professional circles would be called a "crook."

Dr. Voelker speaks of the comparative ease with which the silicate cements may be used by any dentist. I do not agree with him in this; frankly, I feel that the silicate cements are among the most difficult to manipulate of any of our filling materials. In my humble opinion the technique of mixing, inserting, contouring, and finishing a silicate cement filling properly and gaining a perfect result is a task to tax the skill of the most expert operator. While most fillings of this material *do* save the teeth for a reasonable length of time, it is also safe to say that most of them, if dried off and scrutinized after a lapse of one year, will show marked defects. It is my belief that these defects are due more largely to faulty manipulation than to any inherent weakness in the material itself.

I have not been unaware of the influence of acidity on silicate cement fillings, as they certainly do show easily discernible evidence of disintegration in mouths where erosion is progressive and where an acid condition prevails, but I do not agree with the essayist that the operator must choose between the use of dilute fruit acid washes in the mouth and the use of the silicate cement filling. It is the slow but constant action of a perverted secretion, as I understand it, that

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causes erosion, and that incidentally will cause disintegration of the silicate cement filling, and the brief application of dilute fruit acid used as a mouth-wash would not, in my opinion, be of any damage to silicate cement fillings. On the contrary, it is my belief that such washes, producing, as we are told they do, a prolonged flow of alkaline saliva, would really be beneficial to the life of the silicate fillings found in an acid mouth.

When we come to the restoration of corners on the incisor teeth where any material loss of contour has occurred, baked porcelain inlays are still my main dependence. They are not always perfect, and sometimes they come out, but up to date they have, in my observation, done better service than corners built out with silicate cements, either with or without metallic pins for anchorage.

I am sure that all users of the silicate cements are unanimous in their opinions concerning the lack of adhesiveness in this material, and it is interesting to have this defect in the silicate cements explained as it is in the quotation from Dr. Fette of Cleveland. Dr. Voelker, however, points out one silicate cement as being more adhesive than the others, and where adhesiveness seems particularly desirable it would certainly be worth trying.

The really sad part of the history of silicate cements in dentistry is the extensive and constant abuse of the material. I mean a misuse which virtually amounts to abuse. There are times and places in bicuspid and molar teeth when and where a proximo-occlusal cavity may be properly and successfully filled with silicate cement, but in my estimation they are very few. The material has not the inherent strength to stand up in large contoured restorations in bicuspids and molars. It has not the resistance to stand the pounding and stress of mastication, and sooner or later (almost always sooner) the edges begin to chip, the contour becomes involved, food impaction occurs, involving the gum septum, and ultimately secondary decay occurs with its unpleasant train of sequelæ. I have removed from the mouth a great number of such fillings, and have restored the integrity of the interdental spaces and the masticating efficiency of the teeth with cast gold inlays.

While we are all interested in concealing our art by every legitimate method at our disposal, we must recognize the deficiencies of baked porcelain inlays and of silicate cement fillings when it comes to a point of deciding on the best method of restoring contour and efficiency in the bicuspid and molar region. There comes a time when the conscientious operator must decide what method is best to pursue, and the occasions are not few where esthetic considerations must make way for the practical. Let us recognize in the better silicate cements a valuable, I may say even an indispensable material, but let us not ruin their reputation and that of dentistry itself by maltreating and misusing them.

Dr. W. S. Rose, Schenectady. The first point that impressed me in connection with the paper was the immense amount of work that it must have required to compile it, and I wish to congratulate Dr. Voelker on the extraordinary production he has presented to us.

Unfortunately for me, I came in just in time to hear the last reference of the essayist to the question of solubility of silicates. However, in reading over the paper, I felt that I would like him to

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touch on one point that he did not present in the paper, and now I would like to ask Dr. Voelker if he has done this, viz, if he has taken the oxyphosphates, mixed them, pulverized the mix, and submitted them to the same tests as he has the silicates?

What I shall be most interested in today will be the discussion of the practical application of the work. I have used the silicate cements for about ten years, or since the time of the National convention in Buffalo, where so much attention was given to silicate cements. I have not had experience with all the various makes, but have confined myself almost entirely to the use of Ascher's artificial enamel, and whether or not this dissolves when reduced to powder I do not know, but it does not when inserted in the teeth—I have often wished it did, in some instances, on account of the color. Many times patients have come to me with silicate fillings which had been inserted six or eight years previously, with the teeth very badly discolored. That, to my mind, is the chief disadvantage of the silicate cements. I remember at one time that I had an assistant who was particularly apt in matching colors, and we inserted quite a number of silicate fillings, but we noticed in these fillings that discoloration began to take place in a few years. The manufacturers claimed this to be due to faulty technique, but I did not believe that to be the case, as I am convinced from experience that any of the silicate cements I have used will eventually discolor in the mouth. I think the greatest virtue of the silicate filling is its hardness. The fillings appear to be very hard even after having been in the mouth for many years and having become very much discolored. I have used for the last few years what is called a synthetic cement, and since names have been mentioned, I believe that De Trey makes the nearest to a synthetic porcelain of any of the manufacturers. There seems to be some difficulty in getting the public to understand the distinction between silicate cement fillings and porcelain fillings, and I have tried to impress on my patients the fact that this was not porcelain, but a material something similar to porcelain. I think that these fillings compare very favorably with porcelain fillings in durability. Porcelain fillings may be perfect when inserted, but after a few years, say ten, the color of the tooth changes more or less, while porcelain does not, and there again you have the difficulty of maintaining proper color. That objection, however, is not so serious in the case of the synthetic filling, for the reason that the synthetic filling can be replaced with much less difficulty than the porcelain inlay.

Dr. A. P. Burkhart, Auburn. The essayist has well said that success in the use of the silicate cements was largely due to the proper cavity preparation, and to the use of the agate instrument in making the mix. Up to that point I fully agree with him. He has also said that in order to be successful and avoid discoloration, it was absolutely necessary to use tortoiseshell or tantalum instruments. This statement has been made time and again by manufacturers of synthetic cements, and in nearly every instance in selling the material there has been presented an elaborate set of instruments made of tortoise. I wish to say, however, that during at least six years of careful use of synthetic cements I have not used tortoiseshell instruments, and I am frank to say that in that time

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I have not discovered the defects which it has been claimed would follow if instruments other than tortoiseshell were used. I have carefully used well-made nickel instruments, and believe I have had as good success as those who have used tortoiseshell instruments, and in some respects better, because the nickel instruments, being of steel and carefully nickeled, are very firm, and enable the operator to carry the material more safely to position than can be done with the tortoiseshell instruments. I am careful, however, in the use of the nickeled instruments, to have a tumbler of water at hand, and as I carry the material into the cavity, the instruments are immediately carried to this tumbler and carefully cleansed at once. I believe the rule of cleanliness, so far as the instruments are concerned, has been largely responsible for the success with which I have met. I speak of these instruments for this reason: They are as good, certainly, and a great deal less expensive than the tortoiseshell instruments, and one is not continually breaking them. Possibly the results I have obtained, which in the main have been satisfactory, may have been due to a certain extent to luck, but I do not think so. To summarize, I believe that the use of nickeled instruments, if carefully used as I have outlined, fill all the requirements.

Dr. J. H. Carter, Cohoes. In witnessing a clinic given by Dr. Fine of Philadelphia, I obtained a pointer in the manipulation of this material that has helped me very much, viz, a method of holding the strip over the filling while waiting for the material to harden. Dr. Fine used hemostatic forceps with seared beaks and with automatic locks for pulling the strip over the filling. With the forceps closed on the strip and the strip held very firmly for the desired length of time, he was able to get a surface that was ultimately very easy to finish. Dr. Fine was able to obtain and maintain an even, firm pressure on the filling for three minutes, and this aided materially in the setting and final finishing of the filling.

Dr. D. W. McLean, Mt. Vernon. I was particularly impressed by the tests described to determine the solubility of silicate cements. I have occasionally seen evidences of solubility in cases during periods of sickness or pregnancy where the fillings were in cervical cavities or extended to the gingival margin. In these cavities I have become discouraged with the use of the material, and have preferred to use porcelain.

The essayist's brief reference to the inlay cement line interested me. For the past two years I have set perhaps fifty per cent. of my porcelain inlays with silicate cement. The silicate cement used for this purpose should be mixed slightly stiffer than the oxyphosphates are mixed. It must be borne in mind that the material is not adhesive and that the cavity and filling should be prepared with retentive grooves. The silicate cement is certainly less soluble than the oxyphosphate cement, and the color harmonizes so well with the tooth and inlay that it is almost ideal for this purpose. The filling of course should be kept scrupulously dry, and should be held under pressure until the cement has set, say, three minutes, when it should be varnished. In short, it should be treated in the manner prescribed for silicate fillings. Any excess around the margins of the inlay should be disked off when hard, and not broken away.

Dr. Morton Van Loan, Albany.

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Some years ago I saw a synthetic cement filling on the corner of a lower central incisor which the patient said had been there several years, at least two or three, but I had never been able to get synthetic fillings to stay for that length of time in such a position. This last year, however, I devised a plan by which these fillings could be made to stay, which is on the same plan that is used to insert amalgam fillings under the Crandall method, that is, using a 36-gage copper band as a matrix over the whole tooth or a part of the tooth, as the case may need, and inserting the cement under pressure. When I first tried this plan I could not get rid of the oxid in the copper, but a chemist told me that if I would heat the copper and drop it in alcohol it would get rid of the oxid. So that with the aid of the copper band I can insert the filling and condense it under pressure. By this means one is able to build up a corner or edge of an incisor and condense it properly—and I think improper condensation is the reason why many synthetic fillings fail, *i.e.* they are not airtight and watertight, and not enough pressure can be applied to condense the material sufficiently to make a watertight joint. Since I have adopted this plan I have been able to put corners on incisor teeth, and they have lasted a year now with no sign of disintegration, which is more than I could do before. I would say that before the copper band is put on the tooth and after the oxid has been removed from the copper band, it should be greased well with cocoa butter.

Dr. Bertram Ball, Yonkers. My experience with synthetic cement has led me to give up attempting to contour the front teeth with it alone, as I have found that it would not stand the force of mastication. I have therefore adopted the plan of anchoring a pin in the cavity, previously soldering to that a piece of thin plate gold contoured to the posterior surface of the tooth to be restored, to take the force of mastication. I have been doing this for a year, and up to the present time have had but one of these contours to break away, and in that case it was because the pin was not properly set. This can be artistically done in teeth where the anterior edge is longer than the posterior edge, and where it is almost impossible to restore the natural tooth appearance or strength with synthetic porcelain because of the small amount of tooth material on the morsal edge. The force of mastication is taken care of nicely by this gold, which you shape up and solder to the pin, and which gives the proper amount of strength. Care should be taken to keep from reflecting the color of the pin or the gold through the synthetic cement.

Dr. Voelker (closing the discussion). I expected a great deal more criticism than the paper received. With regard to what Dr. Tracy said about acid mouth-washes, I agree with him thoroughly, provided the acid mouth-washes are used rationally and neutralized with some antacid shortly afterward; but the tendency would be to use strong solutions of vinegar or strong citric acid, such as lemon juice, several times daily, and to leave it in the mouth. It takes quite a little time for those acids to be neutralized by the alkaline saliva, and during that time detrimental action would take place. It is similar to the drop of water dropping on the stone continuously for 365 days in the year—in time the surface of the silicate cement would be dissolved. Even a one per cent. lactic acid solution caused a solubility of as much as three times that caused by distilled water—and that is a very weak acid so-

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lution. I agree with Dr. Tracy in his plan of taking out many fillings with edges broken down and in places where the fillings were not indicated in the first place. I have had many similar experiences. I had not been in favor of the use of silicate cement in contour and corner restorations in the front teeth, but so many men having reported good results there, I determined to work along this line to some extent, and we now have fillings in the front of the mouth which have been there as long as one or two years. This is not long enough, however, to give us the clinical knowledge we must have of this material in such places, and which the lapse of time will afford us.

Another point was mentioned in the discussion that I did not take up at this time, but which was brought out in one of my previous papers, namely, the necessity of taking patients fully into our confidence with regard to the nature of the silicate cement fillings. They should not be allowed to carry away the impression that these are true porcelain fillings. Tell them the limitations of this material; that we have not yet a perfect ideal filling material, but that this certainly approximates it, although there is yet much room for improvement. I tell my patients just what they can expect from these fillings, and in that way I do not have any trouble. They are very willing, in the course of a year or two, if the filling washes out, to have it replaced, because silicate fillings are not particularly expensive, they are quite easily put in, and do not necessitate the destruction of sound tooth structure to the extent that the preparation of cavities for inlays does, and the similarity to tooth structure is quite remarkable. I have one little patient under my care for whom I have inserted twenty-five or twenty-six silicate fillings in the front of the mouth—a patient twelve years of age. What else could I do, with so many small cavities? It seemed to me that the silicate cement was the thing to use, and that it would restore the condition of the mouth much better than inlays, especially at that age. I could not use porcelain or gold in this case for obvious reasons.

With regard to silicate fillings discoloring, the old type of Ascher's artificial enamel had that fault, but I do not think that it is so much of a factor in the new material or in any of the other synthetic products.

With regard to Dr. Burkhart's remarks on the use of instruments, I think he hit the nail on the head when he brought out the point of cleanliness in the care and use of the instruments. I think that is the very important point in the use of any instruments. Take a German silver instrument and put orthophosphoric acid on it, and see what happens! You will not be surprised that the fillings discolor when the oxidation from such instruments is worked into the filling material. These cements are made as nearly foolproof as they can be, but we must take every possible precaution in their use. I think if the operator uses a good steel instrument that has been highly nickeled, and takes care to cleanse it carefully and to discard it before the nickel is worn off, he will be able to get good results. But I prefer to use non-corrodible instruments.

I am glad to see that others are using the silicate cements for the setting of porcelain inlays. I have only lately tried this myself, but I think Dr. Van Loan's suggestion for the use of Berylite cement in this manner is a good one, because this seems to be the most adhesive of the silicate cements we have today.

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The Practical Measurements Involved in the Construction of Complete Dentures.

By ABRAM HOFFMAN, D.D.S., Buffalo.

AT the meeting of the American Institute of Dental Teachers, held at Minneapolis during the latter part of January of this year, the statement was made that more teeth are being extracted today than ever before. Such a statement will shock many of us who have been striving to conserve the dental organs; however, if the expression of thoughtful minds constitutes satisfactory evidence, we must come to realize that it is necessary, more than ever before, to think seriously of the substitutes for these organs—for the reason that partial or complete impairment of them will eventually affect other functional activity and the general health.

In a series of experiments conducted by the late Dr. G. V. Black and published in his articles on "Physical Characters of the Human Teeth," contributed to the *Dental Cosmos,* beginning in 1895, it was demonstrated that many of our everyday meat and vegetable foods required a direct stress of about 38 lb. on the average to crush them, and that certain cereal foods, notably bread-crusts, would not cut through under a direct stress of 250 lb., but are easily broken up under the influence of a lateral movement. He further said (*op. cit.* p. 482): "It seems quite probable, however, that many persons unconsciously exert an enormous force upon such foods as are inclined to pack between the teeth." Let us assume that an average stress for this latter class of foods is about 150 lb. upon natural teeth.

Professor Gysi declares that "Dentures are believed to be capable of exerting a pressure not greatly in excess of fifteen pounds, perhaps twenty or twenty-five pounds as a maximum, as compared with the 150 lb. of the natural teeth," and that "Artificial teeth with one-tenth of the power of the natural teeth must discharge the same functions as the natural teeth, or the food cannot be properly prepared for digestion."

Couple the statements of these two authorities, and the underlying thoughts give us the basis or subject-matter of this paper, viz, that in the construction of artificial dentures the function of mastication must be restored to the highest possible degree of efficiency.

In the act of mastication the service of the natural denture is greatly en-

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hanced by a slight lateral or antero-posterior movement in addition to the vertical movement, hence we must endeavor to copy in our artificial dentures the anatomic variations found in the human mechanism—or, if you please, the human articulator.

Man subsists upon a mixed diet, and in order that this variety in foods may be properly prepared for swallowing, nature has given him a highly specialized dental organization—a part of which is an extremely mobile joint known as the temporo-mandibular articulation. A knowledge of this joint and its associated parts concerns us vitally in our efforts to mechanically reproduce mandibular movement, but for the sake of brevity we will assume that all dentists are familiar with the essential anatomical characteristics.

In order to construct artificial dentures anatomically, so that they will properly functionate and harmonize with the natural surroundings, it is further necessary to have certain means for recording the mandibular conditions and movements. The desire for such knowledge and devices has resulted in much serious thought and the invention of many ingenious appliances.

During the period of evolution in which the articulator has changed from the "gate-hinge" to the present adaptable appliance the philosophy of mastication has been discussed at great length, and it seems as if much of the discussion had resulted in confusing the average practitioner rather than enlightening him. Much of the recent literature has been so scientific, theoretic, and replete in detail that only a limited number of men have had the courage to undertake its assimilation. Then, again, such a vast number of good things have been presented to the prosthetic dentist in the past few years that he has been specially attracted toward those appearing to be most practical in relation to his every-day needs. Unquestionably, however, the modern scientific methods in denture construction are gaining in favor.

MOVEMENTS OF THE MANDIBLE.

The manner in which the mandible is suspended from the cranium is interesting. The maxilla forms a stationary base, and the mandible a movable arm or lever held in position by several ligaments operated by several muscles, and with the interposed tissues forms a peculiar ball-and-socket joint which is endowed with a free and complex movement appearing almost to lack co-ordination. This must impress one with the fact that the manner in which the mandible is suspended renders it extremely difficult to locate a positive fulcrum, and that there can be no single, fixed rotation center, but that the centers vary with the individual characteristics of the case in hand; therefore the appliance used to stimulate the movements must be capable of a reasonable amount of adjustment, and its gyrations must approximate those of the mandible.

The mandibular movements that are of interest to the prosthodontist are those directly concerned in the mastication of food, and in this function many of the excursive movements are very, very short. It is the relationship existing between the antagonizing surfaces of the teeth just as they are coming to contact and as the cusps are being guided to their respective fossæ by the inclined planes, that is vital; the extreme positions are of no practical interest.

We have referred to the mandible as

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being a lever. Now, in analyzing a lever we find that it is composed of three factors, viz, a point where the power is applied, a point where the weight or resistance is applied, and a point of rotation or bearing, usually called the fulcrum. The varying position of these factors determines the type of lever, or classifies it. There are three types, and the mandible is of the third type—it is a rigid arm capable of turning about a point to which force or power is applied to overcome resistance. Because of its peculiar, circuitous shape the power may be applied upon two sides of this particular lever and it has two principal points of bearing or rotation, in or near the condyles; these points may move in unison, as in opening the mouth and in protrusion, or alternately, as in the lateral movements.

The chief movements of the mandible as concerned in the act of mastication are the open and shut, or hinge, the right and left lateral, and the forward and backward (to the rest position). As the mandible assumes these different positions the condyles execute a variety of movements, and while they are all theoretically important, some have more practical value than others, and it is these that the writer will endeavor to bring to your attention in the paper with its illustrations.

When the mouth is closed and the condyle is at rest in the glenoid fossa we may say that the point of bearing is at the center of the condyle. In opening the mouth, as for the reception of food, the center of rotation is first at the anterior curved surface of the condyle, and as the mouth is opened wider the slack in the anterior fibers of the external lateral ligament is taken up and a new center of rotation is established at the point of their attachment to the ramus. As the mouth is closed the center of rotation is returned again to the center of the condyle.

In the lateral mandibular movement, due to the contraction of one of the external pterygoid muscles, one condyle serves in a general way as a pivotal point, sometimes having a slight backward movement, but as a rule one more or less lateral and forward, as the condyle of the opposite side travels downward, forward, and inward in its path (Gysi). The lateral movements of the mandible are perhaps more important than the opening and closing or forward movements, because the variety of positions in attrition is greater than in the act of incision. Considerable stress has been laid upon the centers of mandibular rotation and their influence upon cusp relationship in their lateral excursions. It is demonstrated that these centers may be in the heads of the condyles, or they may both be between or both be outside the true condyle centers, or one may be inside and the other outside. This has a certain amount of influence upon intercuspation, but some investigators question its absolute importance, especially since it has been shown (Bennett) that the mandible also has a direct side-to-side movement entirely independent of the ordinary rotation points. These irregular movements or irregular rotation points are probably the direct result of irregular, though possibly habitual, action of the pterygoids. They are not inherent in the anatomical construction of the parts.

In the position of prehension or incision the condyles travel downward and forward in their paths on the anterior surface of the fossæ, due largely to the contraction of the two external ptery-

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goid muscles. The degree or extent of inclination of these paths is important, and aids in the stability of the denture in the act of incising food when the proper balancing bite has been established in the arrangement of the artificial teeth.

BONWILL'S EQUILATERAL TRIANGLE.

The relationship existing between the centers of the condyles and the mesio-incisal angle of the lower first incisors constitutes a triangle (Bonwill), and it is obvious that as the condyles move downward and forward in their paths, constituting two points of the triangle, the lower incisors come in contact with the lingual surface of the upper incisors, and, moving to the edge-to-edge position, constitute the third point of the triangle. The distance here traversed by the incisors is known as the incisive path. It should be in harmony with the excursions of the condyle, and is to be considered in developing the compensating curve of the teeth and the balancing bite.

ANATOMICAL ARTICULATORS.

The three chief movements as mentioned and the incisive path are important factors in the construction of complete dentures by the anatomic method. It now remains for us to decide which of the two leading systems (the Gysi and the Snow) that are in vogue at the present time, together with the necessary technical procedures involved, we individually are to accept for our standard. The Gysi adaptable articulator with its accessories is a most valuable and scientific aid in ascertaining, developing, and demonstrating in detail the mandibular movements, provided it is in the hands of an expert or a painstaking prosthodontist, in which event it will produce results that very closely approximate the natural conditions; but for the average operator the writer prefers the Snow appliances, as they are simpler to manipulate and more easily understood. Observation during eight years and covering a large number of cases constructed in a clinic, and in many instances by men of just ordinary ability, justifies the choice. The latest Snow instruments, one of which is known as the Acme articulator, contain several decided improvements upon the New Century articulator, and with the new Snow face-bow calipers, are destined to become very valuable adjuncts in prosthesis.

However, regardless of the choice of appliances, we must not lose sight of the fact that all the data are obtained with an insecure base-plate resting upon somewhat soft tissue, and that interposed between the condyles and the articular face of the fossa are the cartilage and the two synovial sacs, and that there is a variable muscular tension, and perhaps habits of long standing, all of which are factors to contend with, and they must be taken into consideration in determining whether or not the final measurements are absolutely dependable.

TECHNIQUE OF CONSTRUCTING FULL DENTURES.

In entering into the discussion of the technique involved in the construction of complete dentures by the anatomic method, we will take it for granted that careful attention has been given to charting the case, and that the diagnosis and prognosis have been carefully considered, as well as having obtained properly executed impressions and casts.

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OCCLUSION AND CONTOUR MODELS, OR "BITE PLATES."

The next step involved consists of making suitable occlusion and contour models or "bite plates," and recording with and upon them certain data. The objects to be attained at this time are:

(1) The relationship of the lower jaw to the upper.

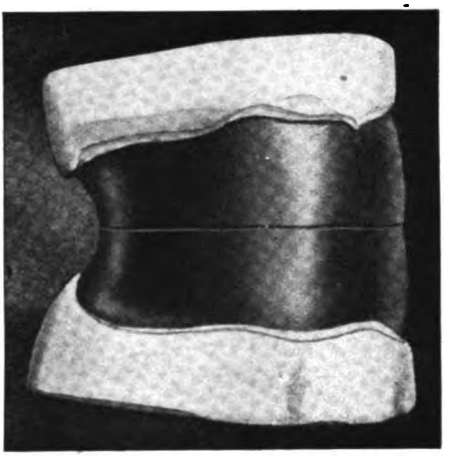
(2) To determine the inclination of the path of the condyle, or to "take the protrusive bite."

(3) To note data which will aid in the selection of the teeth (the several lip lines).

(4) To restore the facial contour and otherwise assist in developing the esthetic consideration.

The first essential to be considered is the material to be used in the construction of these models. The base should be firm and rigid, capable of withstanding a rather severe stress and the temperature of the oral cavity. This condition eliminates the common wax and paraffin combinations. The writer prefers vulcanite, or sheet tin, or a recently introduced gutta-percha preparation, and the preference is in the order mentioned. If vulcanite be used, care must be taken to prevent a change in form during the vulcanization process. If plaster be used for filling the base it may cause a misfit because of the expansion in setting, or there may be a change of form due to compression of the plaster in flasking or vulcanizing. Spence's compound should always be used for this cast because of its strength and negligible expansion and contraction. It is often desirable to make some slight alteration in the face of the cast, either by additions or trimming, in which event the sheet-tin base has decided advantages. Such a base may be swaged and re-swaged in the Parker device with cornmeal until the desired fit is attained. The base should be very carefully adapted and trimmed to the peripheral outline form. If this step has been carefully executed it may be placed in the mouth, and the adhesion, muscular displacement, and leverage tests applied, any error being detected and corrected early in the operation; the value of this can easily be demonstrated. The rim of wax to be added should be of a hard and firm variety; ordinary yellow wax will not do. It should be somewhat larger (longer and fuller) than necessary, so as to permit of trimming at the proper time. The occlusion models should be carefully and completely developed. (See Fig. 1.)

FIG. 1.



Occlusion and contour models prepared for the mouth.

The next steps are as follows:

(1) Place the upper model in the mouth, restore facial contour, and trim the incisive portion to a flat (plane) surface so that about one-sixteenth of an

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inch of wax is exposed when the upper lip is at rest.

(2) Establish the occlusal plane by trimming or adding wax and keeping it flat so that a straight-edge held against it will parallel the naso-auditory meatus line. Chill the wax. (See Fig. 2.)

(3) Soften the lower wax rim, place the models in the mouth, and direct the

FIG. 2.

Occlusal plane developed so that straight-edge parallels the naso-auditory meatus line. (Clapp.)

patient to close slowly until the proper length or balance is given to the lower third of the face.

(4) Restore the facial contour in the lower model. Its surfaces should be continuous with the upper. Chill the wax.

(5) Record the several lip lines and conditions that are to aid in the selection of the teeth.

(6) Obtain the natural (probably the normal) relation of the lower to the upper, "take the bite," and score with two vertical lines in the region of the second molars.

(7) Measure inclination of condyle paths—that is, "take the protrusive bite." This is one of the most important steps in the use of the Snow appliances.

MEASURING THE INCLINATION OF THE CONDYLE PATHS.

We have been told by numerous investigators that the pitch or slant or inclination of the path of the condyle, on the articular surface of the glenoid fossa, varies in different individuals according to the depth of the fossa, and that frequently there is a variation upon the two sides of the same individual. It is desirable to record the degree of this inclination upon the articulator so that the compensating curve and balancing bite can be established in the arrangement of the artificial teeth; in other words, the morsal surfaces of the teeth must move in harmony with the excursions of the condyles. It is necessary to observe but a few cases in order to establish the fact that, as the patient "bites forward," there is a separation in the occlusal surfaces of the bite-plates in the molar regions which is in direct ratio to the pitch of the condyle paths; the nearer the path comes to being horizontal, the less will be the separation in the bite-plates; and conversely, the more diagonal the path, the greater the separation. The amount of necessary protrusive movement for this record is about three-sixteenths to one-quarter of an inch. The plan is entirely practical in its application.

In order to maintain the separation of the occlusion models as the patient bites

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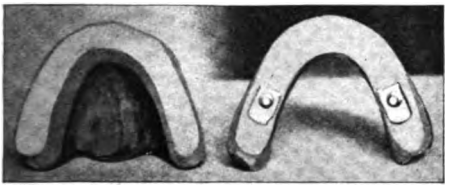
in the protruded position, the bite gages should have been previously slightly warmed and their platform or claw sur-

FIG. 3.



Occlusal surfaces of waxed models with bite gages in position.

faces pressed flush in the disto-linguo-occlusal surface (molar region) of the lower waxed model. (See Fig. 3.) The

FIG. 4.

Separation by bite gages, in the molar region, during the protrusive bite. (Clapp.)

cone-shaped points press against (into) the wax of the upper and keep the two occlusion models apart the proper distance in their distal extremities as the patient is directed to "bite forward." (See Fig. 4.) The writer has noticed that a small mass of softened compound placed around the cone of the gage and compressed in closing is of considerable assistance. When the models are taken from the mouth the compound is chilled. The compound and the gages are now carefully removed and laid away for future use.

ADJUSTING THE SNOW FACE-BOW.

The next step is the adjustment of the face-bow.

The practical value of this device can hardly be overestimated, as it provides a simple and efficient method for mounting the casts upon the articulating frame in such a manner that their alveolar surfaces bear the same relationship to the hinge of the frame as they do to the heads of the condyles (hinge) when at rest in the glenoid fossæ. Not only are irregularities in the horizontal plane reproduced, but the antero-posterior distance is recorded as well. This latter is of great importance, as it permits the opening or closing of the bite, which cannot be done with a uniform degree of safety when the use of the appliance is omitted; and further, in producing the correct radial distance of the casts from the hinges, the teeth when arranged on the articulator, with cusp clearance, in the lateral movements of the mandible will travel in the same lines when the dentures are transferred to the mouth. A fault in the antero-posterior distance will probably result in cusp interference when the dentures are placed in the mouth.

Some writers have laid particular stress upon the importance of having the occlusal plane of the bites in a defi-

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nite horizontal relationship (below) to the hinge of the articulator. The importance of this has been questioned. However, if the face-bow technique is carefully observed it checks a possible error in this regard along with its other virtues. The use of the face-bow forms a distinct step in the series of measurements, and must not be confused with the ordinary understanding of the phrase "taking the bite."

The new special face-bow calipers are designed for the purpose of determining the inter-condyloid width and selecting an articulator body that will approximate the case in hand. The sliding index rods are adjusted so as to come in contact with the integument just underneath the ear and directly back of the ramus, and locked. The appliance is then removed and the distance between the cupped-out knobs is measured. If the distance is less than three and seven-eighths inches it calls for the narrow articulator frame. A measurement between three and seven-eighths inches and four and three-eighths inches calls for the medium frame, and a measurement of four and three-eighths inches calls for the wide frame.

Technique.

(1) Locate the condyle heads and mark the same on the face. This is an important step and should receive more than casual attention, for if the correct antero-posterior distance between the cast and hinge is not established we cannot expect anything other than approximate intercuspation as the teeth travel transversely, nor can the bite be opened or closed without bringing undue bearing upon either the molars or incisors, as the case may be, when the plates are placed in the mouth.

(2) Attach the mouthpiece to the occlusal surface of the upper bite-plate so that the stem is continuous with or

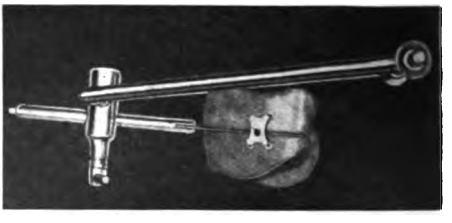
FIG. 5.

Adjusting the condyle index rods of the Snow face-bow. (Prothero.)

horizontal to the occlusal plane, according to the type of mouthpiece used.

(3) The bite-plates with the mouthpiece in position are now transferred to

FIG. 6.



The Snow face-bow and waxed models assembled and removed *en masse*.

the mouth, and the patient is directed to close with moderate firmness to support the mass entire. The stem of the mouthpiece should now parallel the naso-

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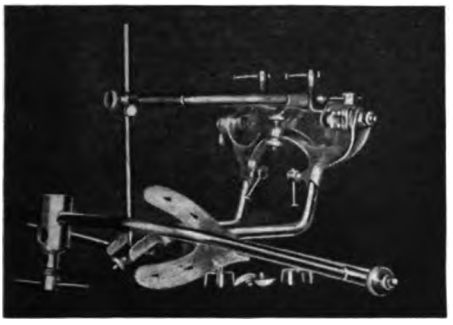
auditory meatus line and lie in the sagittal plane of the head.

(4) Look to or prove the natural bite; see that the score marks previously made

Fig. 7.



Snow's Acme articulator and face-bow outfit.

in the molar region are continuous; fasten with staples.

(5) Slip the swivel lock clamp over the stem, make an equidistant adjustment of the sliding index rods to the previously located condyle heads and

Fig. 8.

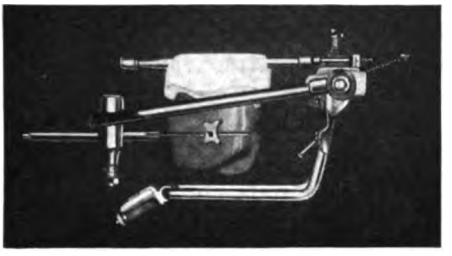
Correct relative positions of the articulator cast supports, face-bow, and waxed models.

lock them. (See Fig. 5.) Meantime the patient or assistant should support and tighten the universal clamp firmly so as to prevent any change in its position.

(6) Loosen index rods, direct the patient to open the mouth wide, remove the face-bow and bite-plates *en masse*. (See Fig. 6.)

(7) Mount the casts on the articulator.

Fig. 9.

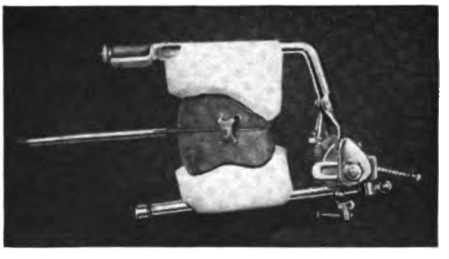


The upper cast placed in the upper waxed model and attached with plaster to the upper support of the articulator.

MOUNTING THE CASTS.

Several new features have lately been added to the New Century articulator, increasing its efficiency and accuracy. Provision is made for the direct lateral movement of the mandible as well as the

Fig. 10.



Face-bow removed, case inverted, lower cast in place and attached to lower support of articulator.

usual swinging lateral movement, and either may be used to the exclusion of the other. An adjustable incisal stay-rod and platform forms a valuable addition and prevents a heretofore common source of trouble, viz, that of springing

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together the upper and lower sections of the articulator during lateral movements while placing the teeth and unconsciously closing the bite. The third feature provides for three different inter-condyloid widths, viz, three and five-eighths, four, and four and one-half inches, limiting the variation in width between the mechanical appliance and the human condition to one-eighth of an inch or less on either side. (See Fig. 7.)

FIG. 11.

Position for holding the case while adjusting the condyle paths.

Technique.

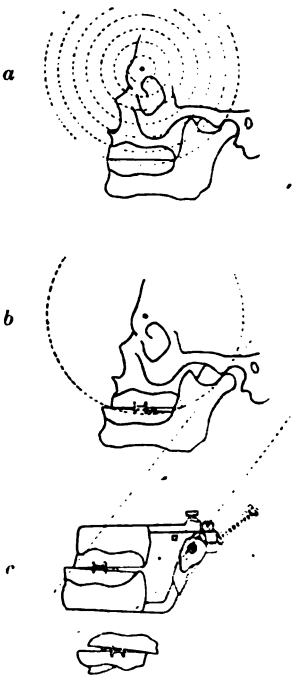
(1) Adjust the central set-screw so that the wire cast supports are parallel; lock them firmly in the body portion of the articulator; remove the incisal guide-pin; place the articulator on the tin platform.

(2) Spring the index rods of the face-bow (with occlusion models in place) over the joint pins at the hinge of the articulator. Level up the stem of the mouthpiece so that it and the occlusal plane of the bite-plates parallel the wire supports; they will now parallel the naso-auditory meatus line as when in the mouth. The articulator, face-bow, and occlusion models are now in their correct relative positions. (See Fig. 8.)

(3) Place the upper cast in the upper occlusion model and attach it with a sufficient (not excessive) amount of plaster. Let the plaster harden. (See Fig. 9.)

(4) Remove the face-bow so as to avoid bulk; invert the articulator with

FIG. 12.



Schematic drawing of what occurs in taking the protrusive bite and adjusting the condyle paths of the articulator. (*a*) Note direction of condyle path, position of condyle head, and relation of occlusion models in natural bite. (*b*) Note the same points in the protrusive bite. (*c*) Compare *b* and *a*. (After Prothero.)

the bite-plates still in place upon the upper cast and still stapled together as in the natural bite; place the lower cast in its "plate" and attach it to the support with plaster which is allowed to harden. (See Fig. 10.) The case is now ready for adjusting the condyle slots of the articulator to the proper inclination.

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(5) Remove staples and mouthpiece; release the spring at the rear of the articulator; loosen the condyle path set-screws; carefully replace the bite gages (and compound, if used) in their former positions on the lower wax model.

(6) Adjust the lower cast and occlusion model to the upper so that the conical portion of the bite gage enters the depression made in the upper at the time the protrusive bite was taken (see Fig. 11); tighten the condyle path set-screws; remove the bite gages, and replace the rear spring.

If this technique has been carefully carried out the occlusion models will now bear the same relation to each other as originally, when the face-bow measurements and natural bite were taken; the last two steps in adjusting the case in the protruded position have affected nothing but the adjustable condyle slots of the articulator, and they should now have the same relative pitch as the condyle paths of the patient. (See Fig. 12.)

COMPENSATING CURVE.

"This term has been used as synonymous with the 'curve of Spee.' It should not be so used, for the curve of Spee belongs entirely to the mandible, and is anatomical, while the compensating curve is mechanical. The compensating curve—as produced for mechanical reasons—is rarely ever found in nature, but may be used in complete artificial dentures. The compensating curve is that arrangement of the teeth whereby the so-called three-point contact is established between the upper and lower artificial dentures. If this curve is to be of any practical value, it must be in harmony with the excursions of the condyle. If the articulating surface of the eminentia articularis is horizontal, the condyle moves straight forward in its excursions, and no compensating curve to the teeth plane is required; but if this articulating surface is oblique, as is usual, then the condyle must also descend when it moves forward. This creates a bent teeth plane, and, as has been stated, it must correspond with the path of the condyle. If a proper relationship is not established between the condyle path and the teeth plane, the artificial dentures will quite likely be dislodged whenever the teeth are occluded otherwise than in the retruded position" (Wilson). (See Fig. 13.) Several elaborate methods have been devised for developing the compensating curve in the wax bite plates. This step is not absolutely necessary, as with a little experience the operator will gain the requi-

FIG. 13.

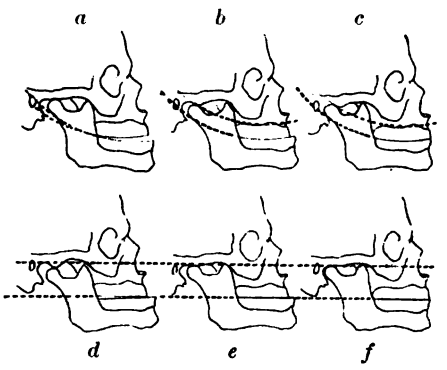

Diagram showing variation in relation of occlusal planes when condyle paths are inclined and horizontal. The horizontal condyle path in *a* requires the straight occlusal plane in the waxed models or in the arrangement of the teeth as in *f* for the natural bite and in *e* for the protruded bite. The inclined condyle path in *d* requires the curved occlusal plane in the waxed models or in the arrangement of the teeth as in *c* for the natural bite or *b* for the protruded bite. The conditions in *a* and *d* are not interchangeable. (After Prothero.)

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site ability to establish the curve at the time of setting-up the teeth; however, the method suggested by Ulsaver is not difficult to execute and may be of assistance. In brief, it consists in alternately shaving off or adding to the occlusal surfaces of the waxed models until the surfaces remain in contact and harmony during the lateral and protrusive movement of the articulator.

It is not the measurement and recording of mandibular movement alone that constitutes the final success of the dentures. We must not forget that the impression, the cast, the peripheral outline, the arrangement of the teeth, the flasking and vulcanizing, hygienic conditions, and the personal equation of the patient—are all important factors and contribute largely to the final result. A fault in technique in any step is magnified in the next step, and in direct ratio to the attention to detail will be the proportion of success.

It is possible to treat this subject in a general way only, in the time allotted to this paper, and the writer has endeavored to comply with the request that accompanied the invitation to read the paper—namely, to give a review of the measurements involved in the construction of complete dentures, and their application in a practical way. It is earnestly hoped that the effort will stimulate more investigation into the mysteries of the human dental mechanism—for it is the sum-total of effort that attains the result.

In conclusion, the writer wishes to say that he lays no claim to originality in the preparation of this *résumé*, but that he has drawn freely from the works of Drs. Black, Gysi, Wilson, Prothero, Clapp, and others, and last but not least Dr. George B. Snow, who for years has been his teacher and guiding hand in prosthesis.

DISCUSSION.

Dr. Ellison Hillyer, Brooklyn. Four years ago I read a paper before this society dealing with the subject which Dr. Hoffman has so ably presented. Since that time there has been much added investigation, and at least one new articulator offered to the profession.

I am impressed by the fact that in many places throughout the country where I have had occasion to be during the past four years, I find many men who have been in practice for fifteen or twenty years, who have either no conception of or no desire to adopt the anatomical methods in prosthetic dentistry. There are, of course, many men who are always ready to adopt improvements and who endeavor to keep steadily abreast of progress. The era in which we are living is one demanding scientific application. The methods of the past when found insufficient have been replaced by those which are scientifically proved to be more adequate for our needs.

The replacement of lost teeth requires for its success all the ingenuity available. Especially is this true in edentulous cases, where the necessity presents of restoring to normal so much of the facial contour, and where there is nothing but the upper and lower ridges upon which

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to build. After the trial base-plates are thoroughly adapted and the contour waxes formed, with the registration of the median, rest, high and low lip lines, and the points indicating the corners of the mouth, it would be folly to practically discard the good work thus far accomplished by transferring the casts to a plain line articulator, irrespective of any anatomical relations. The face-bow as given to the profession by Dr. Snow, and as described by Dr. Hoffman, affords an easy yet accurate means of transferring the waxes from the mouth to the articulator, and of establishing the relative position of the cast to the temporo-mandibular articulation. Had Dr. Snow done nothing more than the giving of this face-bow to the profession he would be deserving of special recognition, and it seems to me that we of the New York State Society should take this into careful consideration.

Dr. Hoffman has described the technique so completely that it requires no elaboration or comment in discussion. If there is anyone in this gathering who has not tried this or some equally good method of procedure in constructing dentures for edentulous cases, let me advise him to experiment along this line, and I can assure him that he will not be likely to return to any less satisfactory method.

Dr. A. C. Bickelhaupt, Syracuse. It is only in the last few years that the general practitioner of dentistry has realized the importance of the scientific study and skill required to properly construct dentures. In the past it has been looked upon as a branch of dentistry requiring little thought, and the fees being generally low, the dentist has regarded his time as being more valuable in other departments of the profession. But now, with the problems of anatomical articulation solved, we are ready to grasp the possibilities that the practice of prosthetic dentistry offers.

It is true that the literature on the modern scientific construction of dentures has been so scientific and confusing that the average dentist has hesitated in adopting the new principles. His predecessor had used the "gate-hinge" articulator for a score of years with reasonably good results, and an anatomical articulator with face-bow attachment has been considered only an unnecessary waste of money.

Dr. Hoffman has covered the subject thoroughly. I think there is only one point I wish to mention, and that is, the accuracy necessary in each step of the work. One step falsely made may defeat the rest of the work. Faulty articulation in the mouth is caused by the models being incorrectly mounted on the articulator. Dentures made to articulate in one position will not articulate at a greater or lesser distance from that point of articulation when the height of the separation between the upper and lower alveolar ridges in the position of normal closure is changed.

Dr. Hoffman (closing the discussion). My clinic on Saturday morning will be supplementary to the paper. At that time I hope to elaborate upon the technique sufficiently so that several hurriedly presented points in the paper may be made clear. I trust that you appreciate my respect for Dr. Gysi and his work. His methods are the most scientific up to this time. I have nothing further to add except that I appreciate the honor of being asked to read this paper, and hope that it will act as a stimulus for more and better work of this character.

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Diagnosis and Treatment of Vincent's Angina: Report of a Case Involving the Lungs.

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VINCENT'S angina of the gums is an acute ulcero-membranous condition of their margins, particularly in the interdental areas, caused by infection with the spirocheta of Vincent, which is always found in symbiosis with fusiform bacilli. It usually appears in the form of an ulcerating surface beginning in the cul-de-sac posterior to the last molar, formed by the buccinator muscle in its attachment to the mandible. However, it sometimes begins on the interdental gum areas between the lower incisors. The ulcerating surface is characteristic, and the condition usually spreads quickly, destroying the tissues with great rapidity. The gums are turgid, swollen, bleed easily, and show the characteristic grayish white border. The breath is extremely fetid, and the pain is intense. In very acute cases there is frequently an excessive flow of saliva simulating mercurial salivation, and it is sometimes mistaken for this condition. It is more frequently found in the gum tissue about the teeth of the mandible than in the maxilla, although when present on the mandible, if it is not checked, the tissues of the maxilla sometimes become involved. It is both infectious and contagious, and unless prompt treatment is given usually extends to the tonsils and sometimes the lungs. The temperature of the patient usually ranges around 101°, and I have seen cases where it went as high as 103°.

REVIEW OF THE LITERATURE ON VINCENT'S ANGINA.

The occurrence of this disease is more frequent than our literature on the subject would seem to indicate, as I find very few references to it in our dental journals. Apparently, from the literature that I have been able to secure on the subject, it has been recognized more as a tonsillar disease than as one of the gums. An epidemic of this trouble, affecting the tonsils more particularly, occurred recently in one of our public schools.

In an editorial on "Acute Ulcerous Gingivitis" in the *Dental Review* for November 1915, page 1191, attention is called to this disease in the following language:

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This disease, first described by Dr. Thomas L. Gilmer in the *Dental Review* of May 1906, seems to be somewhat on the increase. At the time Dr. Gilmer wrote he made the statement that it was "seen but rarely," and in a relative sense this may still hold true, but it would seem in recent years to be more common than formerly. Up to the time of Dr. Gilmer's article the present writer recalls having seen only two, or possibly three, cases —the third having been so mild as not to be wholly typical—but within the past year at least four cases have come under his notice.

To quote briefly from Dr. Gilmer's article: "The onset of the disease is sudden, the earliest symptoms being indicated by slight malaise, which is quickly followed by rapid ulceration, at first confined to the gingivæ, usually about two or three of the anterior teeth on both jaws simultaneously and in corresponding localities; later it is extended to the gums about a number of the teeth, or groups of teeth, but rarely if ever does it include the entire gum margin."

Commenting on this editorial, I would say that this description readily fits Vincent's angina, although the writer does not state that this is the disease referred to. However, in the *Journal of Infectious Diseases* for 1911, page 317, Tunnicliff, of the Memorial Institute for Infectious Diseases, Chicago, says, "Since isolating fusiform bacilli and spirilla from the normal mouth I have isolated in pure culture three strains from cases of ulcero-membranous angina—Vincent's angina—one from a case of ulcero-membranous gingivitis, and one from a case of noma of the face." In a footnote she says, "I am indebted to Dr. Thomas L. Gilmer for the opportunity of making a culture from a case of gingivitis," thus proving my surmise to be correct. Tunnicliff says also in her conclusion, page 321, "The strains of fusiform bacilli isolated in pure culture from the normal mouth, ulcero-membranous angina and gingivitis, and noma appear culturally, morphologically to be the same organism."

Bruce, in the *Lancet,* August 16, 1904, describes this disease of the gums in conjunction with the tonsils. Crandall, in *American Medicine,* August 1904, reports a case of infection of the tonsils in which it rapidly spread to the gum margins, the disease affecting the gums for a considerable time after the condition in the throat had cleared up. Allen, in "Vaccine Therapy; Its Theory and Practice," 1913, considers that spirochetæ and spirilla are connected with, if not responsible for, the severe anemia which is sometimes met with in cases of pyorrhea. In the *Journal of Infectious Diseases,* 1913, page 438, Chas. Krumweide, Jr., and Josephine S. Pratt, of the research department laboratory, department of Health, New York City, in a report upon the fusiform bacilli cultural characteristics, give very instructive information as to their method of culture.

It has been believed for many years that the fusiform bacillus represents a transitional stage of the spirocheta. W. P. Larson and Moses Baron, University of Minnesota—see *Journal of Infectious Diseases,* 1913, page 429—show the fusiform bacillus isolated from the blood, in which apparently the fusiform bacilli assume the characteristic shape of Vincent's spirocheta, but say, "The relation between the fusiform bacilli and spirilla that are usually associated with them in direct smears is still an open question. However, the later writers, Tunnicliff, Perthes, and Neuhof, believe them to be different forms of the same organism. Our work would seem to confirm fully the later authors."

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MICROSCOPIC EXAMINATION.

The diagnosis of Vincent's angina microscopically is very simple. A smear from the ulcerating surface is made on a ground-glass slide, using a platinum loop, the smear carefully fixed over the flame of an alcohol lamp and stained for a few seconds with carbol-fuchsin, washed, and then stained with methylene blue for from three to five minutes, washed and dried, and examined under one-twelfth oil-immersion objective. The Vincent spirochetæ and fusiform bacilli being Gram negative do not stain, but are readily distinguished from the other masses of bacteria seen in the field. The form of the Vincent spirocheta is typical, and cannot be readily confused with the other spirochetic forms. They usually appear in very large numbers, as also do the fusiform bacilli.

TREATMENT RECOMMENDED BY VARIOUS AUTHORS.

In the *Dental Cosmos,* November 1912, page 1288 (translation from *Le Laboratoire et le Progrès Dentaire,* Paris) Dr. J. Zilz recommends treatment of this infection with a 10 per cent. solution of salvarsan in water or glycerin, or suspended in one of the fatty oils, such as olive oil or paraffin, applied locally. In the *Dental Cosmos* for July 1914, page 883, Dr. J. Citron (*Berliner klin. Wochenschrift*) says: "In treating Plaut-Vincent's angina, paint with a glycerin-salvarsan mixture—0.1 gram salvarsan triturated in a mortar with 5 cc. of glycerin." Dr. Gilmer recommends an antiseptic mouth-wash such as a boric acid solution, after cleansing the surfaces with a 3 p. c. hydrogen dioxid solution, followed by an application of compound tincture of benzoin, and as a constitutional treatment, four tablets of mercurous chlorid, ½ grain each, morning, noon, and night, followed by a saline cathartic on arising. Dr. C. N. Johnson, *Dental Review,* November 1915, recommends the thorough cleansing of the parts with an antiseptic spray driven by compressed air, followed by the application of crystals of argyrol, placing a small crystal, less than the size of a pinhead, in each interproximal space, and allowing them to melt and flow down into the interstices between the teeth. This I have not found effective in advanced cases. Crandall, *American Medicine,* August 23, 1904, recommends the use of potassium chlorate, but does not give the dosage.

In the treatment of a large number of these cases I have adopted the following plan successfully: Cleansing the mouth thoroughly with a spray of 3 per cent. hydrogen dioxid; after this, where the ulcerations are very deep, applying pure trichloracetic acid followed by 5 per cent. sodium chlorid solution as a mouth-wash every two hours. As a systemic treatment a five-grain tablet of potassium chlorate is administered twice daily, the patient allowing the tablet to dissolve slowly in the mouth, and swallowing the solution. This I have found decidedly the most effective treatment, although I have never used salvarsan.

Brophy—"Oral Surgery," page 301—recommends dry methylene blue applied locally. The objection to this treatment, however, is that the methylene blue stains the teeth.

CASE REPORTS.

Case 1. Mr. R., traveling man, age twenty-five, apparently well and strong physically, applied for treatment for what he had been told by dentists whom he had consulted in

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other cities was acute pyorrhea alveolaris. On examination, the mouth showed clinically Vincent's angina, which had spread so as to completely involve the gums of both mandible and maxilla. He had been suffering about ten days with this trouble, and was in intense pain, besides being greatly annoyed by an excessive flow of saliva. The breath was fetid and the gum margins covered with the characteristic grayish white membrane. A smear was taken from the ulcerating surfaces, stained, and examined under one-twelfth oil-immersion, and Vincent's spirochetæ and fusiform bacilli were found in large numbers. This case had been aggravated to a considerable extent by the patient's having followed the recommendation of someone whom he had consulted, *i.e.* passing floss silk between the teeth frequently. This of course opened up fresh areas for infection, as the same piece of silk was transferred from one interproximal area to another.

Treatment. The mouth was sprayed thoroughly with 3 per cent. hydrogen dioxid; the deep ulcerating surfaces were touched with pure trichloracetic acid, followed by a mouth-wash of 5 per cent. sodium chlorid every two hours, and the administration of two five-grain potassium chlorate tablets, one in the morning and one at night. After fifteen days' treatment the condition was much improved. At this time another smear was made, and only a few spirochetæ and fusiform bacilli were found. The treatment was continued for a few days longer, when the case completely cleared up.

In all of these advanced cases the interdental gum tissue is completely destroyed, and of course is never restored. This leaves the mouth in a very uncomfortable condition, as foods have a tendency to pack into these areas. In this case the tonsils were becoming involved, but the treatment with the chlorate of potash cleared them up also. I have treated in the last fifteen or eighteen years some thirty or forty of these cases, but it seems that in recent years they are becoming more frequent.

The following is a case report in the practice of Dr. Allen Bunce, and shows how easily these infections can be transferred to the lungs:

Case 2. The patient, Mrs. J. S., age thirty-four years, entered hospital on November 24, 1915. Family history, negative; past history, negative.

The present illness began three months ago, when the patient developed a cough. Since that time she has gradually lost weight. Has been in bed for six weeks, during which time she has coughed almost continually, expectorating large quantities of sputum. She has been having a slight fever, especially in the afternoon, for two months. This cough and expectoration continued to such an extent that her local physician made a diagnosis of tuberculosis, although several sputum examinations had been negative for tubercle bacilli.

Patient appears very much emaciated, is restless and nervous. On inspection her gums were found to be swollen and ulcerated at the gingival margins. They appear spongy, and are only loosely attached to the teeth. Pressure on the gums causes pus to flow from around nearly all of her teeth, both upper and lower. The breath is very foul. The teeth are not decayed.

Physical examination. Heart, normal. Lungs: Dulness and increased vocal fremitus from the apex of the right lung extending downward to the fourth rib. Auscultation shows numerous fine and coarse moist râles over this entire area. Abdomen, negative. Pulse, 92. Temp., 100°. Respiration, 20.

Laboratory examinations. Sputum: The sputum, which is large in amount, has a yellowish appearance, with many small coagulated particles. The amount expectorated in twenty-four hours is approximately one liter. Microscopical examination shows a great many Vincent's spirochetæ and fusiform bacilli present. Blood: Red count, 3,800,000. Hemoglobin, 50 per cent. White count, 6800. No malarial parasites present. Wassermann reaction, negative. Urine: Chemical examination shows a trace of albumin and indican. Microscopical examination shows a considerable amount of pus and a few granular and hyaline casts; otherwise negative.

Diagnosis. Vincent's angina affecting the gums, mouth, and lungs.

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Treatment. The patient was put on a nutritious soft diet. She was given a small dose of calomel to cleanse the intestinal canal; also an antiseptic mouth-wash, and put on five grains of potassium chlorate twice daily. On December 1st, the number of spirochetæ and bacilli had diminished, and the amount of sputum was about half what it was at the beginning of the treatment. The patient's general condition showed improvement. On December 5th there was a still greater decrease in the amount of sputum and number of organisms. On December 10th, no spirochetæ could be demonstrated in the very small amount of sputum present. The general condition of patient was much improved. On December 12th, no cough; no spirochetæ or bacilli. On December 13th, no cough, no spirochetæ or bacilli present; pulse and temperature normal. The patient was then on general diet and able to sit up. On December 15th, she was dismissed. Pulse, temperature, and respiration normal. No expectoration. Had gained a number of pounds in weight, and was able to sit up and walk around.

We last heard from the patient in February, when she was apparently entirely well.

In conclusion, let me say that the securing, staining, and microscopic examination of a smear taken from the mouth only occupies a very few minutes. An assistant can be easily trained to prepare the slide for examination after the smear has been made, and it only takes a short time to become reasonably expert in examining the field for the different forms of bacteria found therein. A more accurate knowledge of the diseases of the mucous membrane of the mouth and the appearance of these tissues in disease, as well as familiarity with the microscopic picture of the discharge from pyorrhea pockets and ulcerating areas, is much more essential to a complete understanding of these pathological conditions than we have heretofore been wont to admit, and to this end intelligent and frequent use of the microscope should be more a routine of office practice.

DISCUSSION.

Dr. H. S. Vaughan, New York. I have been interested in the subject of Vincent's angina for the past nine years, and during that time have seen some thirty-five cases in private practice, besides a large number in hospital and dispensary work.

Vincent's angina appears as an inflammatory lesion which may attack the gums, cheek, tonsils, or pharynx. This soon develops into a pseudo-membrane which may resemble diphtheria, and later it develops a rapid ulceration with marked tissue destruction. Smears from these ulcerated areas show almost pure growths of fusiform bacilli and spirilla.

Plaut, Vincent, and others have reported a constant finding of these organisms, although they were first described by W. D. Miller in 1882, in his work on micro-organisms of the mouth.

Quoting from a previous paper by the speaker: "This infection is of the greatest importance to the dental practitioner, as many cases of pyorrhea owe their inception to the destruction of the interproximal gingival tissues produced by this ulcerative process, which when allowed to extend soon destroys the sup-

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porting structure of the teeth; or, again, a Vincent's infection following upon a pyorrhea produces rapid destruction of the remaining tooth support."

These cases are of far more frequent occurrence than is usually supposed, and many are not recognized until irreparable damage has resulted to the interproximal tissues, the recent cases showing only a slight destruction of the tip of the interproximal gum festoon, which becomes very tender to pressure by the tongue or with the tooth-brush, the interspaces being filled with a grayish deposit made up of destroyed tissue cells and masses of the specific bacteria. When this is removed, a raw, sensitive surface remains which bleeds freely on pressure. If unchecked, the result is complete destruction of the interproximal gingiva, pericementum, and alveolus, forming deep pockets that are very difficult to cleanse. The growth of this deposit is very rapid, accumulating again in an hour or two. In nineteen of the cases reported by the speaker, fourteen were males and five females.

The subjective symptoms vary from slight sensitiveness to the touch to severe constitutional symptoms, with a temperature of 102° or higher, dysphagia, headache, malaise, nausea, marked salivation, loss of appetite, submaxillary and cervical adenitis. A characteristic feature in many cases is salivation at night, the pillow being stained with blood-streaked saliva. The breath is offensive, having a sweet, sickening odor of distinct diagnostic importance to one who has noted it in previous cases. The clinical diagnosis should always be confirmed by microscopical examination of smears.

The treatment varies with the severity of the case. The first essential is thorough cleansing of the teeth and mouth, and a light diet; the bowels should be freely opened, and cold compresses or an ice-bag used to reduce the glandular enlargement. As a local application to the ulcerating areas the speaker prefers argyrol—the direct application of the crystals. The teeth should be kept clean, the patient being instructed to use a bulb water syringe to flush out each interproximal space.

As a mouth-wash, the patient should use—

℞—Glyceriti acidi tannici, ʒiv
Aquæ camphoræ, q.s. ad ℥iv

Sig.—Half a teaspoonful in one ounce of water, to be held in the mouth four or five minutes, every two hours.

Dr. J. B. West, Elmira. I think Dr. Hinman has brought a very timely subject before the dental profession. This winter I had three cases of what I had always termed acute ulcerative gingivitis. One of these cases, particularly, had been the rounds of several dentists, and had been treated for pyorrhea. He had had everything injected in the interproximal tissues from iodin to emetin. The case proved to be one of ulcerative gingivitis, or according to Dr. Hinman and Dr. Vaughan, Vincent's angina. I feel that this is a topic that should be thoroughly aired, because I believe many men are making the mistake of calling acute ulcerative gingivitis pyorrhea.

Dr. A. M. Moody, Chicago. I cannot talk to you very much about the fusiform bacillus infection of the gums —so-called acute ulcerative gingivitis. I think that term should be used, however, rather than Vincent's angina. Angina has reference to the throat rather than to the teeth, and it seems to me that the term Vincent's angina should not be used in connection with infection of the gums

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or their infection by the organisms described by Vincent. It may possibly be interesting to you for me to review briefly the history of this organism.

The bacillus fusiformis was first described in connection with the teeth and infections about the teeth by an American dentist, Dr. Miller, who practiced abroad and made his researches there. Descriptions of this organism have not varied much since his first report, which appeared in 1882. In 1884 a man by the name of Babès described the organism in connection with ulcerative conditions of the tonsils. This condition was named in 1894 by Plaut, and in 1896 by Vincent, and has since been known as Plaut-Vincent's angina. The disease resembles a diphtheritic condition of the throat, except that instead of having a definite membrane that is elevated, there is a depressed, distinctly ulcerating area, and smears from this material contain an organism as described by Dr. Hinman. This organism is very widely distributed, and especially we find it in putrefactive processes, not only in the mouth but in the skin and elsewhere. We find it in the lungs, in the chest cavity—that is, empyemas of the chest—in the intestines, particularly the colon, in the genito-urinary tract, and in the brain. Whenever we have such putrefactive conditions and the patient dies from generalized infection, we find these bacteria also in the blood. This organism is always associated, in my experience, with at least two other organisms, and I have examined material from many cases where B. fusiformis has been found thus associated. These two organisms are anaerobic streptococci which we believe usually do the damage, and a small Gram negative bacillus named by Massini as "bacillus annuliformans." I have some pure cultures of these organisms, but unfortunately forgot to bring them with me. They produce a black pigment when grown on blood media.

The bacillus fusiformis is an anaerobic bacterium—*i.e.* it grows in the absence of oxygen. That has a practical bearing on clinical cases, especially from the standpoint of treatment. The object of the treatment should be to supply oxygen to the region where we have infection from the Vincent organism. Another condition that helps the anaerobes to grow is the previous destruction of tissue by the ordinary pyogenic organisms—namely, the streptococcus, the staphylococcus, and micrococcus catarrhalis—which we find always present in the mouth.

In regard to these putrefactive lung affections, it has been my privilege to examine a number of lung abscesses. In the material from these abscesses there is an absence of pus cells, and a stained smear appears as a mixed culture of bacteria. This material is grayish brown, quite fluid in character, and has a fetid odor.

With organisms growing under anaerobic conditions, putrefaction results, and that is why, as Dr. Hinman mentioned in the paper, we find such conditions about the gums. The reason is that putrefaction cannot take place at all in the absence of growths of these particular types of organisms, that is, anaerobes.

My experience so far as treatment is concerned is extremely limited. I have, however, treated a few patients with Vincent's angina, an ulcerative condition of the tonsils and the pharynx, and the treatment has been the very simple one that was suggested by Dr. Gilmer—viz, systemically giving small doses of

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calomel, with the local application of hydrogen dioxid in a spray, or any other mild antiseptic you care to use. I have used hydrogen dioxid and glycerin in equal parts, and had the patient gargle with that frequently.

Dr. T. L. Gilmer, Chicago. I wish to correct an error. I believe you all appreciate the fact that an error made in setting type will follow one all through life. In the original article published by me on acute ulcerous gingivitis, a mistake was made in setting the type which made me say that I gave doses of "four-fifths of a grain" of calomel. My manuscript read, four tablets of one-twentieth of a grain, which was *one-fifth* of a grain per dose, not four-fifths, as I was made to say. The wrong dosage has naturally been given by everyone who has quoted my article.

Dr. Hinman (closing the discussion). I want to thank the gentlemen who have discussed the paper, and especially Dr. Moody for giving us his method of staining. There is nothing further to say on the subject. I objected in the paper to the use of argyrol because of its liability to stain the teeth. I know of one case in Atlanta where the patient was given a preparation of argyrol, 15 per cent., to be used as a mouth-wash several times a day, and the teeth were stained black.

I wish in closing to make another plea for the use of the microscope as a routine in daily practice. It takes only a few minutes to stain a specimen for study, and it is the only way in which we can hope to familiarize ourselves with the microscopic appearance of the bacterial field we are treating.

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A Clinical and Experimental Study of Chronic Alveolar Abscess in Relation to Systemic Disorders.

By THOMAS L. GILMER, M.D., D.D.S., Sc.D., Chicago, Ill.

SOME dentists, and a few physicians likewise, are of the opinion that too much emphasis has been placed on the theory that apical abscesses and infections in the peridental membrane are very common causes of many of the bodily ailments adjacent to or remote from the mouth. It is not improbable that the damage done by oral foci in the production of systemic disorders is at times over-estimated, since over-enthusiasm is generally the rule following new discoveries in medicine. Time is required to determine the exact truth relative to the part which such foci play in causing systemic disorders; however, so much has already been proved and the theory is so reasonable that we cannot ignore its possibilities.

Many of us still remember the time when the germ theory of disease was denounced by many good men as untenable. Today, no one versed in medical science will dispute its truth.

To attribute every ailment to which man is heir to foci of infection is poor logic for either medical men or dentists, but to stop one's ears to well-proved facts is equally illogical. The pride of the dentist is touched when his field is invaded and his operations criticized; yet, in the light of modern methods of examination, some of the work of the best operators is seen to be very imperfect.

Since we have positive knowledge that certain diseases remote from the mouth are often due to definite species of bacteria, and since we have found these organisms in alveolar abscesses, we should not feel incensed at the medical profession or our *confrères* who have traced the source of certain disorders to our imperfect work, but should rather energize ourselves to determined efforts in the future to prevent similar results so far as within us lies.

A very common attitude of some dentists and not a few physicians in the past toward chronic mouth infections has been one of comparative indifference, and such lesions have rarely occasioned any concern whatever to the layman. Should a similar chronic infection, such as is commonly found in the jaws, exist in one of the long bones it would at once be recognized as a matter of grave importance.

Recently, however, this lethargy has

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changed to concern on the part of the physician, the dentist, and the layman; each is now wide awake to the possibilities of such conditions, and the radiographer has been working overtime in an effort to afford information as to whether or not the jaws harbor lurking causes for secondary manifestation of disease.

MILLER'S WORK ON THE MOUTH AS A FOCUS OF INFECTION.

Before the advent of the science of bacteriology some physicians, as a result of clinical observation, associated oral infections with certain lesions of the body which they were unable to cure until the diseased teeth had been removed and the mouth freed from disease. Miller's words, in a series of articles which appeared in the *Dental Cosmos*, commencing September 1891, entitled "The Human Mouth as a Focus of Infection," were prophetic of facts which are now well established. He said, "During the last few years the conviction has grown continually stronger, among physicians as well as dentists, that the human mouth, as a gathering-place and incubator of pathogenic germs, performs a significant rôle in the production of varied disorders of the body, and that if many diseases whose origin is enveloped in mystery could be traced to their source, they would be found to have originated in the oral cavity." Hunter of England was among the first, if not the first, to definitely point out the relations existing between mouth infection and systemic disease. He arrived at this conclusion from clinical observation, and it remained for Billings, Rosenow, Davis, Poynton, Grieves, and others, to settle the question by laboratory investigation.

Acute infections have long been believed to disseminate toxins which produce systemic manifestations. It was also well recognized a long time ago that areas of localized infection in one part of the body set up secondary foci in other parts, as in diffuse nephritis, which often follows acute attacks of tonsillitis. It was also observed that septic emboli from wounds or as the result of surgical operations were carried by the blood stream from the wound to distant parts, and caused secondary infections. The knowledge of these facts is older than the science of bacteriology.

If acute infections are capable of producing disabling metastases, why may not chronic infections do the same? The prompt subsidence of secondary lesions, such as iritis and neuritis, after the eradication of a primary focus, such as a chronic abscessed tooth, is striking evidence of the relationship of these abscesses to the secondary manifestations.*

FREQUENCY OF FOCI OF INFECTION.

Very few adults are without a focus of infection in some part of the jaws. In connection with a course of lectures given last January by Dr. Arthur D. Black for the University of California on "Diseases and Treatment of the Peridental Membrane," radiographs were made of the jaws of sixty-three consecutive persons, the large majority of whom gave no history of secondary effects, and every case showed an infection of some sort. That serious secondary manifestations are not more common as a result of these foci is probably due to two factors; first, to the normal resistance of

* Irons and Brown, *Journal of the American Medical Association*, 1916.

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the individual's tissues, and second, to the fact that the bacteria of chronic processes are usually of relatively low virulence.

In the mouth there are normally a great variety of bacteria, some saprophytic, others pathogenic. This paper does not contemplate the discussion of the bacteria of the mouth in general in their relationship to alveolar abscess, but is confined specifically to consideration of the organisms found in chronic abscess cavities in the jaws. However, the organism which we have found in chronic alveolar abscess, *i.e.* streptococcus viridans, is very generally present in the mouth. The source of the organisms found in our study of these abscesses has been considered problematical. In the past it was very generally supposed that they always found access to the infected area through the root-canal. This conception is not necessarily correct in all cases, since it is well known that teeth become abscessed which have no cavities of decay, and we know that it is impossible for bacteria to pass through sound enamel. A much more reasonable hypothesis is that root abscesses are frequently secondary to other foci in the body, and that bacteria reach the apex of the root through the blood or lymph streams. Since infections of the joints, heart, and other organs, as is well known, are of hematogenous origin, there can be no reasonable objection to the theory that infections in the jaws may have a similar origin.

ELECTIVE LOCALIZATION OF BACTERIA.

The laboratory investigations of Rosenow on the elective affinity of streptococci for certain tissues is one of the most interesting additions to the subject of focal infections that has been made.* His investigations tend to show not only that there is an affinity of special strains of streptococci for certain tissues, but that specimens collected from lesions in an organ or part, such as the appendix, when injected into an animal produce in a large percentage of cases similar lesions in the same organ. For instance, he found that cultures obtained from infected appendices in fourteen cases, when intravenously injected into animals, produced appendicitis in sixty-eight per cent. of the sixty-eight animals injected. Cultures made from muscles in three cases of myositis when injected into forty animals produced myositis in seventy-five per cent.

So far as we know, streptococcus viridans, the predominating organism found in chronic alveolar abscess, has not heretofore been shown to exhibit definite elective localization for the apices of the roots of the teeth, but if a part of the peridental membrane covering the apical portion of a root becomes debilitated or is destroyed by infection, by arsenic or other medicament, or by the presence of a foreign body such as root-filling material, the lowered vitality or dead parts of the tissue offer cultural media for the growth of bacteria which may by chance be brought to the locality by the blood stream, with the probable final result of an alveolar abscess.

Multiple infections may be present in various parts of the body, and any one of these foci may be sufficient to cause metastases, or all may be contributing factors. In the same individual there may be chronic pericementitis, alveolar abscess, maxillary sinusitis, and gonorrheal

* *Journal of the American Medical Association*, November 1915, vol. lxv, p. 1687.

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urethritis; the removal of any one of these foci may lighten the patient's load, and as a result, his condition may be temporarily bettered, but not permanently cured. The patient and his physician become discouraged, and in some instances the whole theory of focal infection as a cause of secondary manifestations is condemned.

To insure a cure, all possible contributing causes must be removed. If a cholecystitis exists, the gall-bladder must be drained. If alveolar abscesses, pyorrhea, or maxillary sinusitis are present, these must be eliminated, otherwise a complete cure of the secondary lesion cannot be reasonably anticipated.

Again, it is unreasonable to expect a joint to resume its normal function if changes have taken place which cannot be repaired, even though all foci of infection which were contributing to the cause of the disability have been removed. To arrest the progress of the disease and to prevent other lesions, all foci of infection should be removed. Even though one has no lesion resulting from a focus of infection, if a focus exists it should be removed as a prophylactic measure.

It is worse than useless to employ vaccines for the cure of metastatic infections so long as the primary focus, such as an alveolar abscess, remains. If abscesses are drained and the tension relieved, the natural resistance offered by the body is generally sufficient to bring about a cure independently of the aid of vaccines.

Closed infections, such as blind abscesses and deep pyorrhea pockets, should be considered more dangerous than freely discharging infected areas. Pus discharging into the mouth may be swallowed and produce various disorders, but Irons says it is an open question as to whether superficial suppurating areas should be regarded as capable of causing metastases.

EXPERIMENTAL WORK TO DETERMINE THE SPECIFIC BACTERIA WHICH CAUSE ALVEOLAR ABSCESSES.

It has not been long since we believed, and even yet some maintain, that alveolar abscess is due to the staphylococcus. The writer was of this opinion until, with Dr. Moody's co-operation, an experimental study of the bacteriology of alveolar abscess was made.* The results of our study showed the prevailing organism found in acute abscesses, in a small series of experiments, to be the hemolytic streptococcus, and that chronic alveolar abscess was uniformly due to the streptococcus viridans. Since our report was made it has been generally conceded that the bacterium of chronic alveolar abscess is of the viridans type of streptococcus, but some still entertain the belief that the staphylococcus is the cause of acute alveolar abscess.

Moody and I have continued our study of the bacteriology of chronic alveolar abscess over a period of two and one-half years, and while we have occasionally found a staphylococcus colony in our specimens from chronic alveolar abscesses, it has been so rare, and when found the colonies have been so few in any one specimen, that we are inclined to the opinion that they were accidental contaminations.

Davis, Baugher, and I made similar studies of the bacteriology of alveolar abscess two years prior to the work by Moody and myself. The results of this study, while not giving such uniform re-

* *Journal of the American Medical Association*, December 5, 1914, vol. lxiii, p. 2023.

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sults, still on the whole parallel very closely the later investigations. Improved technique in collection of specimens and methods of culture, also greater discrimination in the selection of cases, account for the difference in results.

TECHNIQUE OF PROCURING CULTURE SPECIMENS.

It requires great care to collect uncontaminated specimens from alveolar abscesses. In our collection of specimens we have selected cases in which there were no observable sinuses opening into the mouth or elsewhere, and we have not included in our experiments abscessed teeth affected with deep pyorrhea pockets, since in such cases the probability of getting uncontaminated material would be extremely doubtful. The method observed to prevent contamination was as follows: The teeth and gums were cleansed carefully and washed with 95 per cent. alcohol. The tooth to be extracted was then removed with sterile forceps, care being used to prevent the roots from coming in contact with contaminated areas in the mouth and elsewhere. To collect the specimens, a glass pipet was drawn at one end into a long attenuated tube of small caliber. This was then sealed by heating, and the larger end plugged with cotton. When the tooth was removed the tip of the contracted end of the pipet was broken off and flamed, and the specimen from the abscessed portion of the root was drawn into the tube by suction on the cotton-plugged end. The small end was then sealed by fusing, and the specimen was at once sent to the laboratory for culture and examination. In some instances we have secured specimens from abscesses after resection of roots. In such cases the tooth and also the gums over the area to be incised were thoroughly cleansed and sterilized, and the area protected by sterile gauze while the apex of the root was being exposed and excised. A specimen was then secured from the abscess cavity by the use of the sterile pipet. The cultural results have been the same in each instance, that is, almost uniformly pure streptococcus viridans.

Animals were inoculated intravenously with these pure cultures of streptococcus viridans and the results carefully noted. Later, at the necropsy, the various organs and other parts of the body were critically examined to note pathological changes. The specimens secured from the pathological areas were cultured in many instances, and the streptococcus viridans found.

This work was undertaken to corroborate the bacteriological findings reported in July 1914 by Gilmer and Moody; to see the effect in rabbits of intravenous injections of strains of streptococcus viridans isolated from chronic alveolar abscesses, and finally, to note any tendency toward special localization which these bacteria might have.

In order to obtain the results which follow, a definite technique for collection, bacteriological examination, and method of injection was followed. All material was collected according to the method described above.

REPORT OF LABORATORY EXPERIMENTS WITH ANIMAL INOCULATION.

The remainder of this paper is the report of our laboratory study and experiments with animal inoculation. All of the bacteriological work was done in the laboratory of St. Luke's Hospital,

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Chicago, by Dr. A. M. Moody, and the following is his report:

The material to be examined was received in sterile, sealed capillary pipets. It was diluted in 1 to 2 cc. of sterile bouillon, and thoroughly mixed. Cultures were then made in four different ways, using one-fourth of the amount for each method. The methods used were as follows: Aerobic cultures in blood-agar plates, and ascites dextrose broth; anaerobic cultures in blood-agar slants (Wright's method), and ascites dextrose agar shakes.

The ascites dextrose broth was put up in centrifuge tubes containing just 10 cc. of the medium. At the end of from eighteen to twenty hours' incubation at 37° C. the broth culture was sedimented at high speed (4000 r.p.m.), the sediment taken up in 5 cc. of physiological salt solution, and 1.5 to 2 cc. of this was injected into the ear vein of each of two rabbits. Blood-agar plate cultures were then made of the suspension to determine the organism and also the approximate number contained in each cc., which was found to be about 125,000,000.

Transfers were made at the same time from the isolated green colonies of streptococcus viridans in the plate cultures made from the original material. These were inoculated into ascites dextrose broth, and after eighteen to twenty hours' incubation injected in two more animals.

The animals, after injection, were allowed to live from five to eight days, and were then killed with chloroform and immediately autopsied. The routine of the post-mortem was to systematically examine every part of the body, including the skin and nervous system. All pathological conditions were recorded as soon as they were discovered.

The animals used were young rabbits averaging about 1000 gm. in weight. After injection they are usually stiff, and do not move around as much as before injection. This condition persists for a few days, and unless permanent lesions develop they recover from this condition of stiffness.

In our experiments we have examined material from fifty-five patients suffering from chronic alveolar abscess. Forty-nine of these yielded cultures suitable for animal experimentation. Four of the six discarded showed no growth, and the other two were contaminated with other organisms, so that it was impossible to isolate streptococci soon enough for injection.

PERCENTAGE OF LESIONS FOUND IN RABBITS AFTER INTRAVENOUS INJECTION OF STRAINS OF STREPTOCOCCUS VIRIDANS. (*Isolated from material from chronic alveolar abscesses in the patients of the various groups into which they have been divided.*)

Groups.	No. of patients.	No. of animals injected.	Appendix.	Stom. hem.	Stom. ulcer.	Gall-bladder.	Pancreas.	Intestines.	Joints.	Pericardium.	Endocardium.	Myocardium.	Muscles.	Kidneys.	Lungs.	Skin.	Eye.	Jaw.	Thymus.
A	15	50	1.7	35.7	10.	10.	13.	3.3	35.4	0.0	16.7	7.2	46.3	13.3	6.	0.0	0.0	13.	1.7
B	15	57	1.7	50.	13.3	7.2	3.3	3.3	22.2	3.3	22.2	5.	30.5	10.	10.	1.7	3.3	16.7	5.
C	19	71	0.0	37.3	7.9	3.9	3.9	1.3	21.	0.0	22.7	7.9	35.9	24.1	9.6	1.3	1.7	20.3	1.3
Averages			1.1	41.	10.4	7.	6.7	2.6	26.2	1.1	20.5	6.7	37.6	15.8	8.5	1.	1.7	16.7	2.7

Group A. Chronic alveolar abscess and articular rheumatism.
" *B.* " " " " systemic disease, but no articular rheumatism.
" *C.* " " " " no other illnesses.

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The growths obtained were in nearly every instance pure cultures of streptococcus viridans. Occasionally a stray colony of staphylococci and hemolytic streptococci were found.

One hundred and seventy-eight rabbits were injected with pure strains of streptococcus viridans isolated from material from forty-nine patients with chronic alveolar abscess. Of this number only twenty-seven died following the injection. The others were killed with chloroform as stated above. The accompanying table details the results of the inoculations.

These patients have been divided into three groups in order to compare the results of animal inoculation. Group *A* comprises the material studied from fifteen patients suffering from chronic alveolar abscess and articular rheumatism; group *B* material from fifteen patients suffering from chronic alveolar abscess and some form of systemic disease other than articular rheumatism; and group *C* material from nineteen patients suffering from chronic alveolar abscess, but no other illness.

SUMMARY AND CONCLUSIONS.

From the table of the results of animal inoculations it is easily seen that the streptococcus viridans from chronic alveolar abscesses produces lesions in rabbits more frequently in certain regions, *i.e.* stomach, muscles, joints, endocardium, kidneys and jaws. These lesions were as a rule more frequent in group *A*, and least in group *C*. The percentage of lesions occurring after inoculation of organisms from groups *A* and *B* averaged about the same.

We must conclude, then, that the streptococcus viridans isolated from chronic alveolar abscesses in patients who in addition are suffering from systemic disease is capable of producing a higher percentage of lesions in rabbits, in the usual regions involved, than similar organisms isolated from uncomplicated chronic alveolar abscesses.

DISCUSSION.

Dr. R. Ottolengui, New York. I absolutely do not consider myself competent to discuss the paper, because its object is to impress upon those who do not know what they *should* know—and to the extent that I have not been impressed, the essayists have failed in their object. I wish to say that I have the highest regard for the essayist and the gentleman who has given us an explanation of the details of the technique, and wish it distinctly understood that where I appear to criticize them, it is impersonal, and the great probability is that they are right and I am wrong; but I am merely bringing these points out so that we may get more instruction from them in closing the discussion. With that preface, it seems to me that the most important thing for us to discuss is, What has been proved by this paper? Singularly enough, neither of the gentlemen have made any deductions; they seem to have presented their arguments and left it for us to draw conclusions. If it has been intended to prove that streptococci viridans injected intravenously have an elective affinity for certain organs in the body, I think the paper has shown this to be quite probable, but if it has been intended to show that abscesses of apical areas necessarily produce these lesions, the paper has not proved it. It seems to me that the paper has proved this—that if the streptococci viridans are collected from the end of the root

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and taken to the laboratory and treated according to the formula cited in the bacteriologist's report, and then injected into the rabbit, it would make the rabbit sick. That seems to be conclusively proved, because all the rabbits got sick, but that these rabbits would have gotten sick in that particular way if the primary focus had occurred at the end of the rabbit's tooth has not been proved. When this subject has been up before for discussion when I have been present, I have asked for more absolute proof, and have been told that I showed my ignorance every time I asked for it. This paper seems to give me the opportunity of showing my ignorance again, perhaps, but at the same time it also gives me an opportunity of pointing out to investigators wherein it seems to me their deductions are not necessarily a logical sequence of their work. We are asked to believe that infections at the ends of the teeth may cause these distinct lesions, and in evidence of that we are told that when the streptococci viridans are collected and introduced into the animal organism intravenously, they do this thing. It seems to me that to prove this logically we must introduce these organisms into the tooth, seal them in, and produce apical infection in the animal as a primary focus, and as the secondary result, produce these distinct lesions. That may be possible, but at the same time it seems to me that the evidence adduced is short of being satisfactory, in that it does not prove that the lesion produced is analogous to the lesion that we are told occurs in the mouth.

The essayist says in one part of his paper: "Since we have positive knowledge that certain diseases remote from the jaws are often due to definite species of bacteria, and since we have found these organisms in jaw abscesses, we should not feel incensed at the medical profession or our *confrères* who have traced the source of certain disorders to our imperfect work, but rather energize ourselves to better efforts in the future to prevent similar results." Later on in the paper, speaking of how apical infections occur, he says: "However, the organism which we have found in chronic alveolar abscess, streptococcus viridans, is very generally present in the mouth. The source of the organisms found in our study of these abscesses has been considered problematic. In the past it was very generally supposed that they always found access to the infected area through the root-canal. This conception is not necessarily correct in all cases, since it is well known that teeth become abscessed which have no cavities of decay, and we know that it is impossible for bacteria to pass through sound enamel. A much more reasonable hypothesis is that root abscesses are frequently secondary to other foci in the body, and that bacteria reach the apex of the root through the blood or lymph streams. Since infections of the joints, heart, and other organs, as is well known, are of hematogenous origin, there can be no reasonable objection to the theory that infections in the jaws may have a similar origin." In the first quotation the essayist states that infection at the end of the root arrived there through the blood or lymph, and that it may not be the primary focus, and yet in another place he says that when we find these lesions associated with rheumatism it is a coincidence of cause and effect. There seems to be just a little of that sequence that I cannot follow.

To show again how differently different men read statistics, we have had

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three tables here this afternoon, and they have been introduced to show the elective affinity of micro-organisms for certain parts of the body, which I am willing to accept, but it seems to me that the most important deduction to be made from these tables has not been pointed out to us. I believe I am correct in stating that this argument is presented to us to prove that systemic disorders may have their origin in foci at the ends of the teeth. You will observe that in these tables we are asked to believe this, because bacteria collected from these teeth did produce lesions of this character in lower animals, notwithstanding the fact that in "group *C*," where all of the animals inoculated with these germs suffered from these identical diseases in only a little less degree, none of the individuals were sick in this way. It therefore does not follow that the fact that rabbits got sick when you injected streptococci viridans intravenously proves that a human being with streptococci viridans is going to get sick in the same way, because we see here fifteen human beings who did not, and yet from these perfectly well people we get these results. It therefore seems that what the paper does prove is what the streptococcus viridans does, regardless of whence it is gathered.

To get down to the dentist's side of the proposition, gentlemen, it has not been proved that these systemic disorders are absolutely produced in this way. This theory has been advanced and has been accepted by the medical profession, and the dentists have not been able to disprove it. In this condition we have gone to the radiograph—and we have been stripped to our nakedness with regard to the defective work that we have done; it has shown just what kind of root-fillers we are, and as Dr. Raper showed on the screen yesterday, it is not multi-rooted teeth that we do not fill—we do not fill any of them. The radiograph has found as many single-rooted teeth in which we have failed as multi-rooted teeth. Now, that is a shortcoming that we will have to make up; we at least must do that.

There is one portion of the paper that I indorse thoroughly, namely, that where you have foci in the body they must be cleared up. If a man has an infected gall-bladder, it must be cleared up, and if he has an infected tooth *that* must be cleared up, not because the physician has proved that it may cause rheumatism, but because the dentist cannot prove that it will not. Therefore the only safe ground for the dentist to take is to do his work so that any infection at the end of a root which may produce these diseases cannot be attributed to his faulty technique. Now, I know that someone will say that there are teeth that you cannot fill to the end; but just forget that until you have tried and tried, and found that you cannot fill them to the end, and then, if you are not over-egotistic, go to another man and see if he can do so. Then, if he cannot fill it, you will have to determine whether you can afford to risk the health and life of your patient by leaving it there with the possibility that it may cause all kinds of diseases because you did not fill these roots; and I assure you, gentlemen, if you do that, you will find you are filling more and more teeth to the end. Just get the thought out of your head that it cannot be done; that other men claim they can do it and are more successful than you are, simply because they use another technique—it is only a matter of practice, and you can do it. If you can

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do that, then it does not make a lot of difference about all the things that streptococci viridans will cause. We can let Gilmer, Rosenow, and the rest of the investigators fight that out.

Dr. J. P. Cole, Dobbs Ferry. Your president has indeed bestowed upon me a great but rather risky honor in asking me to discuss a paper of such scientific merit as the one we have just heard. The main object of Dr. Gilmer's paper seems to be to prove to the dental profession that streptococci viridans from chronic apical alveolar abscesses without fistulæ when injected into the blood stream cause various systemic diseases in different parts of the body, and that the streptococcus viridans is the germ of chronic abscesses rather than the staphylococcus.

I am not a pathologist, but a general practitioner of dentistry, and therefore I shall discuss the paper strictly from the viewpoint of the general practitioner.

Such painstaking laboratory investigations of this subject as have been carried on by eminent students of dentistry and medicine prove conclusively to my mind that the duty of every dentist to his patient upon examining the mouth is to ascertain as definitely as possible whether the patient has an abscess of any kind which may be undermining the patient's constitution, or may be the cause of some systemic disease which he already has. Therefore the real point of interest to the general practitioner is not whether the germ is a streptococcus viridans, a hemolytic streptococcus, or a staphylococcus, but that if we find an oral abscess, whether apical, fistulous, pyorrheal, or what not in the oral cavity it must be eliminated. As Dr. Gilmer states, it is very poor logic to claim to cure all systemic diseases by the simple expedient of curing an oral abscess, and I should like to be sure that such a thought might be indelibly impressed upon the mind of every dentist in the profession without delay.

We must be conservative, we must not jump at conclusions until we are sure of what we are doing, and vaccines must be used with great care.

Promiscuous extraction of teeth should be considered malpractice. If the possibility of systemic infections due to alveolar abscesses has only made dentists throughout the world stop and think and realize what germ-harboring dentistry we have been doing in the past, the awakening to this possibility has been a great thing for humanity. But that is only a small part, for systemic infection from the oral cavity is one of the most serious facts in medical science today—one of vital importance to mankind.

Dr. Gilmer states that closed infections are more dangerous than freely discharging areas. He does not say why, but he tells us that in the chronic abscess we have the streptococcus viridans, while in the acute abscess we have the hemolytic streptococcus, and we know clinically that when we open a putrescent canal and allow air—oxygen—to come in contact with the dormant germs present, the abscess is more apt to become active than not. We all know how quickly a patient's physical resistance and general constitution go down as soon as an acute abscess starts. I personally do not believe that the streptococcus viridans necessarily gets to the apex of a root through the root-canal, but in many cases I believe it is deposited there through the blood supply from some other perhaps remote organ.

I have for several years considered the mouth as more or less of a barometer,

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which records the pathological conditions of many if not most of the organs of the human machine, and it is only due to our ignorance that we are unable to diagnose many systemic conditions by proper examination of the oral cavity.

In the table of the results of his experiments that Dr. Gilmer has given us, I note that classes *A* and *B* greatly exceed in many instances class *C*, as much in many cases as 300 per cent. The only cases in which *C* is greater than *A* and *B* are in the jaws and kidneys, which would tend to prove to me—and, as I say again, I have but little or no knowledge of pathology—that where the patient has only alveolar abscess, then the streptococcus viridans acts principally on the jaws and kidneys. When the patient has other diseases, then the germs act principally on other organs.

Does this or does it not go to prove that the presence of streptococci viridans simply indicates that there is something wrong with the kidneys, the pancreas, gall-bladder, intestines, or other organs?

I should like very much to know more about these experiments of Dr. Gilmer's. I should like to know if the patients from whom he took his cultures received a thorough physical examination before he removed the roots, or what the complete diagnosis of each patient was in classes *A* and *B*, and in reference to the roots extracted, were they roots that had faulty fillings in the root-canals, and if so, what material had been used? Had they ever had acute abscesses previous to the time he saw them? What antiseptic precautions had been taken by the dentist who had filled them? Were they roots that nature was endeavoring to exfoliate, or were they roots that had the tooth crown still present on them? If the crown was still present, did they have cavities extending into the pulp chamber or not? It would seem to me that until the time comes when the dentist shall keep a complete record of his own cases, getting a physical diagnosis if need be from the patient's physician, and making a diagnosis of the oral cavity by means of the X-ray as well as superficially, then and only then shall we know where we really are on this subject.

To me oral pathology is still in the embryonic state, and if every man in the profession would put his shoulder to the wheel and devote the amount of time, energy, and thought to working out of some of our problems that Dr. Gilmer has done, it would not be long before the dental profession would be among the greatest if not the greatest of blessings to humanity.

Dr. H. J. Kauffer, New York. I have been very much interested in the paper, and especially in the manner in which the essayists have tabulated the conditions as they found them. Believing that a large number of dermic disorders were ordinary subjective symptoms expressing the presence of toxins, whereas the objective symptoms in many of these cases might be found in the buccal cavity, I expressed my opinion to Professor Fordyce, and was appointed mouth diagnostician to the department of dermatology and syphilology at the Vanderbilt Clinic, where I am conducting investigations along this line. I have several cases that I think will be of interest, and I would like to present them.

Case 1. Fig. 1 shows a case of erythema multiforme, in which can be seen the lesions on the arm, neck, cheek, and forehead. Erythema multiforme is most commonly found on the extremities. This condition appeared in cycles of from three weeks to a month; that is,

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about every three weeks or month the patient would have an itching sensation on the neck and forehead or arm, when these blotches would appear. There would be an irritation of the parts, followed by hyperemia, which in a few hours would assume a purple hue and which would slowly disappear until the next cycle. On examination of the mouth we found a rarefied area over the upper right central tooth (Fig. 2), where the root-canal had been punctured. Fig. 3 shows a rarefied area at the apex of the anterior root of the lower right first molar, with incomplete root-canal fillings in both roots. On removal of this molar we found pure diplococcus pneumoniæ. On opening through the alveolar process at the apex of the central incisor (Fig. 2), we found pus from which we obtained a similar culture. I removed this root-canal filling, excised the apex, and irrigated through the apex of the tooth. The condition of erythema multiforme occurred more frequently when I opened up this abscess, and instead of recurring in cycles of from three weeks to a month, it recurred in periods of from three days to a week on several occasions. We then removed the molar, as already mentioned, and the patient three days later developed pneumonia of the lungs, but whether it was a coincidence independent of the alveolar abscess, or whether the germs were carried to the lungs by the blood stream, I do not know. However, after the extraction of the tooth the patient had no further attacks of erythema multiforme. I saw that patient a month ago and she reported no further evidence of the disease, the blotches having disappeared very slowly; at that time were all gone.

Case 2. A case of acne papulosa (Fig. 4), in which are shown the papules on the shoulder. This patient had acne well developed over the entire back. a condition which had existed for several years. On X-ray examination (Fig. 5) we found that the alveolar process had

Fig. 1.

Fig. 2.

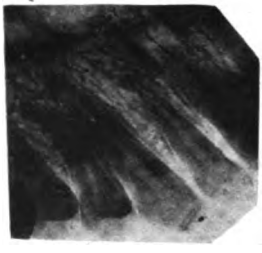
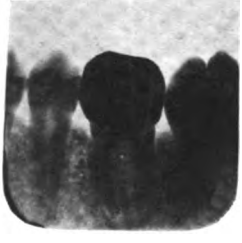


Fig. 3.



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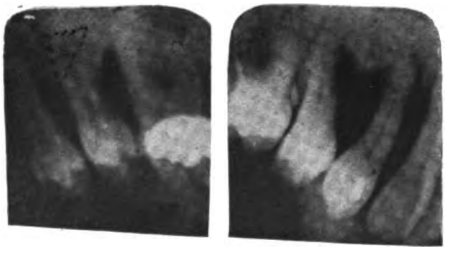
been resorbed from around most of these teeth, which of course will not surprise one who has seen the clinical condition of pyorrhea. On removal of the teeth from which the alveolar process had been almost entirely resorbed, and treatment of the pyorrhea, the acne disappeared. The

FIG. 4.

FIG. 5.



patient has now been under observation for six months, and has had no recurrence of the acne.

Case 3. This was another case of erythema multiforme, the blotches appearing around the knee, on the leg (Fig. 6) and on the buttock. (Fig. 7.) This patient presented a history of erythema dating over two years, with cycles of recurrence from three weeks to two months. On X-ray examination of the

FIG. 6.

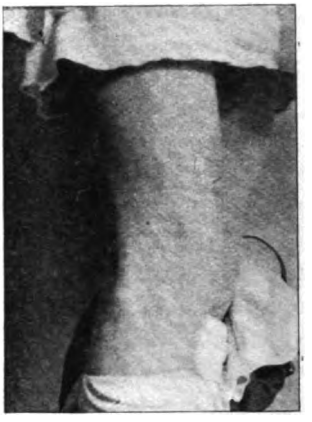


FIG. 7.

FIG. 8.

mouth we found a crown upon a lower right bicuspid with a slight attempt at filling the root-canal of this tooth, and

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showing a rarefied area at the apex of the root. (Fig. 8.) The bacteriological findings in this case also showed diplococcus pneumoniæ. The tooth was removed and the socket curetted. After the removal of the tooth the patient, as in the first case, developed more rapid

FIG. 9.

FIG. 10.

cycles of the expression of the disease, that is, instead of the blotches occurring at periods of from three weeks to two months, they recurred two or three times during one month, showing that after we have excited the foci in these cases there is more rapid absorption of the toxins, with more frequent expressions of the disease.

Case 4. A case of erythema of the neck, the chin, and the hand. (Fig. 9.) This erythema was in the nature of the weeping form of exanthematous erythema. The irritation was almost continuous, and had a history of over two

FIG. 11.

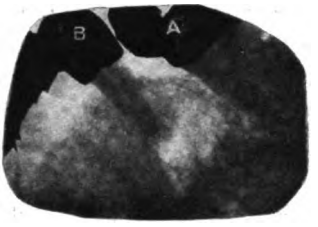
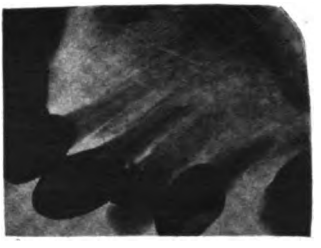


FIG. 12.

FIG. 13.



years' duration. This picture (Fig. 10) taken three months after the removal of the teeth (A and B in Fig. 11), shows that the condition of the hand has improved considerably, with no marks upon the neck and face. Upon X-ray examination of the mouth there were found on bridge abutments a number of incomplete root-

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fillings (Figs. 11, 12, and 13), with apical areas of rarefaction. I removed these teeth (A and B, Fig. 11) and curetted the bone, removed the bridge, opened through the alveolar process to the apices of the roots of the canine and second bicuspid (Fig 13), and on cleaning out the root-canals and curetting the alveolar opening I found that here, too, we had, as the result of disturbing this focus, a more rapid and more exaggerated expression of the disease. Later I filled the root of the canine (Fig. 13), as the soft tissues had healed. Three days after closing the root and stopping what little drainage there may have been from that point, we observed an expression of the disease in an itching at the point of the chin, which seemed to be particularly sensitive to this form of toxin. When the root-canals were again opened and drainage permitted, I also reopened through the soft tissue and irrigated the area, and again the condition cleared up. After this was treated three times and the root-canals closed up there was no recurrence of the dermic disturbance.

Unfortunately, there is no known method of obtaining an uncontaminated culture from the skin with which we may compare the bacteriological finding at the apex of a tooth that we consider to be the point of the focus; however, when pathological conditions in the mouth have been removed and the dermic disturbances clear up, it is reasonable to assume that the poisons which have caused these disturbances were within these foci in the mouth.

You will observe in these lesions that only certain parts of the skin are attacked. This is explained by the fact that they are the only parts sensitized to the particular toxin which attacks the skin. This may also explain why bacteria, when injected into some animals, will in some cases show the presence of the toxins capable of producing arthritis, myocarditis, etc., while in others the same bacteria give negative results.

Dr. H. E. S. Chayes, New York. I wish to say to Dr. Gilmer and to the others who have discussed the paper that we are apt to become so ultra-scientific that we are likely to take a tumble, and find ourselves as far away from science as ever. It was only this morning that Dr. Bloodgood stood on the platform and attacked the use of chlorate of potash in the mouth; then in the afternoon Dr. Hinman advocated the use of chlorate of potash in the treatment of Vincent's angina. Isn't that scientific! We all realize, I am sure, that when there is inflammation or abscess at the end of the root of a tooth we must get rid of it. What difference does it make whether it causes systemic lesions in near or remote parts of the body? The essential thing is to get rid of it, and stop arguing as to whether or not any particular bacterium causes a particular lesion. It is not so much what the bacteria does to man as what man does to the bacteria; it is not so much the fact that we have not filled the root to the end, as it is the fact that most roots which are filled carry fixed pieces of bridge work, and the fixation of that root interferes with the circulation in the tissues, prevents nutrition from coming there, and thereby increases the susceptibility of these tissues to any infection which may come from some other part of the body to that weak spot. When you reduce the amount of nutritive material in any part of the body, that part of the body offers an "open sesame" for every kind of bacteria that may come there. The human being is

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an automatic organization, and any fixation of a part of the human body must finally cause destruction of that part. No one of you could perform dental operations if you had your fingers tied together; you could not walk well with your toes tied together, and the same difficulty is encountered in trying to masticate the food with the teeth tied together. And so I say let us not take so much time in arguing as to whether or not a particular infection is the cause of a particular disease; we must cure that disease—it is a morbid process, and nature will not tolerate it no matter where it is found—and then let us refrain from stabilizing any part of the mechanism.

Dr. R. Ottolengui. Dr. Chayes just said that Dr. Bloodgood spoke of the danger of using chlorate of potash, and that following that Dr. Hinman advocated its use. Dr. Bloodgood was speaking against the common practice of the use of chlorate of potash in a mouthwash when a man is a smoker—that is, the constant use of it—and Dr. Hinman was recommending chlorate of potash as a specific medicine for a specific disease. We know that there are many escharotics which may be used to advantage in destroying unhealthy tissue, and yet these same escharotics would be ruinous if used on healthy tissue.

Dr. Gilmer (closing the discussion). I wish to thank the gentlemen who have discussed my paper, and am not unaware of the honor the New York Society has conferred on me by asking me to present this subject. I take Dr. Ottolengui just exactly as he is, and am not displeased that he should have taken exception to some parts of my paper, but on analysis you will observe that he does not materially disagree with me. Dr. Ottolengui does not seem to have a proper conception of my paper. He seems to think that I came here to prove something. Far from it, I did not come here to prove anything. We have been told certain things by men standing high in the medical profession, and also similar things by men in the dental profession, and I wished to know the truth about their statements. We made this study to discover the truth, and gave you the result of our labors; we offer them to you for what they are worth. I believe there is much truth in the theory that focal infections in the jaws cause diseases in remote parts of the body. It may be that we have not proved anything, it may be that Rosenow has not proved anything; we believe, however, that we have and that he has proved something. There is one thing I *do* know, and Dr. Ottolengui or any other man who will interest himself in this work sufficiently may find out the same thing from clinical experience; that is, we have seen hundreds of cases that have had one sort of illness or another, and when certain foci of infection have been removed the patients have recovered and remained well, whereas they have not been cured by other treatment. Isn't that worth something?

I have seen erythema patches on the face of a patient who had alveolar abscess, and when I cured the abscess the erythema cleared up. This is only one out of many conditions I have seen which have subsided on the cure of jaw abscesses. Dr. Brown, the ophthalmologist, and Dr. Irons, the internist, collaborating in this work in the Cook County Hospital in Chicago, have cured many patients suffering from iritis by removing abscessed teeth. Does this not mean something? These patients have

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been going to this hospital for treatment for various forms of the so-called rheumatism and other diseases. Dr. Irons has had the patients under close observation, and has found focal infections in the jaws and elsewhere, and when he has removed these foci the patients have been cured. In the past, patients with similar disorders, treated by the older methods, had been returning to the hospital with recurrent attacks every six months or so, but now, under the newer method of treatment—viz, removal of the focal infection—these same patients remain well.

To give you an idea of the virulence of some of the bacteria found in apical abscesses I will report one case. I removed two abscessed teeth that were piers for a bridge. From these I secured specimens, and when they were cultured in the laboratory by Dr. Moody he injected the organisms, streptococci viridans, into animals; in twenty-four hours the animals were dead.

Dr. Ottolengui. May not the root infection be secondary?

Dr. Gilmer. It may be secondary, as was said in the paper.

Dr. Ottolengui. In another place you said it was primary.

Dr. Gilmer. It would be primary if the bacteria came through the root-canal from the mouth, and secondary if brought to the apical space by the blood stream from some other part. We may first have an infection in the apical space, then secondarily in a joint, and then the organisms may again reach the jaws, where, if there are other pulpless teeth, a second alveolar abscess may develop; thus we have the vicious circle completed.

Dr. Cole asked if the teeth had faulty fillings. Yes, many had faulty root-fillings. Some had artificial crowns, some had cavity fillings, some had root-canals poorly filled, some were well filled, and some were not filled at all. Dr. Cole also asked if physical examinations and diagnoses were made in the cases reported. They were, but not by myself, because I am not an internist.

Dr. Moody. I would like to add just a few words. The question has been asked, What has been proved by this paper? In answer to that I will summarize the conclusions we have arrived at as the result of our work:

(1) That the streptococcus viridans may cause diseases in various parts of the rabbit's body is certainly demonstrated in this series of experiments.

(2) Whether the character of the lesions produced by streptococci from individuals who, aside from the condition of the teeth, are in perfect health, warrants the conclusion that the patients would have developed similar conditions had these foci of infection not been removed, is a question which cannot be satisfactorily answered. Many of these patients organisms from whom produced marked lesions in rabbits are well past middle age, and otherwise in perfect health.

(3) The character of the lesions produced by the organisms from cases without systemic disease is identical with those produced by organisms from patients with systemic infections, the only difference being that the former produced lesions less frequently than the latter. This fact seems to demonstrate a difference in the grade of virulence of the organisms.

(4) In these experiments there is abundant evidence both for and against the elective affinity of streptococci for certain tissues. Therefore, because of these varying results, one must conclude

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that the localization of the streptococcus viridans here studied is not alone to be determined by some property inherent in the organisms themselves.

I think these conclusions cover the main points. It is impossible for one to arrive at definite conclusions in work of this kind, because we must remember that we are working with lower animals, not with human beings. There are certain things, however, that we can demonstrate. The most important point that we can demonstrate is the fact that these organisms are virulent in animal tissues, and we may assume that these organisms are also virulent in human tissues. From clinical observation we know that having virulent organisms in the body while the body is in a diseased condition is dangerous to the individual. We never know when there will be a condition of lowered resistance in the body, and these organisms which are continually traveling in the blood stream may lodge at a point of lowered resistance, and there produce a focus of infection —that is what we have tried to prove. We know that in chronic abscesses we have virulent organisms, and we believe we may have a focus of infection there which may produce some disease condition in remote portions of the body.

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[THE membership of the State Society, in accordance with the By-laws adopted May 1913, is composed of all the active members of the nine District Societies. See District Societies, pages 41 to 62.]

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Stowell, S. S., Pittsfield, Mass.

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Annual Session.	Name.	Residence.	Date of Election.
Organization	Amos Westcott	Syracuse	June 30, 1868
1st	B. T. Whitney	Buffalo	July 28, 1869
2d	L. W. Rogers	Utica	June 30, 1870
3d	W. B. Hurd	Brooklyn	June 29, 1871
4th	C. A. Marvin	Brooklyn	June 27, 1872
5th	J. G. Ambler	New York	June 26, 1873
6th	W. C. Barrett	Warsaw	June 25, 1874
7th	W. C. Barrett	Warsaw	July 1, 1875
8th	C. A. Marvin	Brooklyn	July 13, 1876
9th	L. F. Harvey	Buffalo	May 10, 1877
10th	A. M. Holmes	Morrisville	May 9, 1878
11th	C. E. Francis	New York	May 14, 1879
12th	O. E. Hill	Brooklyn	May 13, 1880
13th	O. E. Hill	Brooklyn	May 12, 1881
14th	L. S. Straw	Newburgh	May 9, 1882
15th	L. S. Straw	Newburgh	May 10, 1883
16th	L. S. Straw	Newburgh	May 14, 1884
17th	F. B. Darby	Elmira	May 15, 1885
18th	N. W. Kingsley	New York	May 13, 1886
19th	N. W. Kingsley	New York	May 11, 1887
20th	J. E. Line	Rochester	May 9, 1888
21st	E. D. Downs	Owego	May 7, 1889
22d	W. W. Walker	New York	May 14, 1890
23d	W. W. Walker	New York	May 13, 1891
24th	W. W. Walker	New York	May 12, 1892
25th	F. L. Van Woert	Brooklyn	May 10, 1893
26th	F. L. Van Woert	Brooklyn	May 10, 1894
27th	H. J. Burkhart	Batavia	May 9, 1895
28th	H. J. Burkhart	Batavia	May 14, 1896
29th	H. J. Burkhart	Batavia	May 13, 1897
30th	F. Le Grand Ames	Albany	May 12, 1898
31st	F. Le Grand Ames	Albany	May 11, 1899
32d	J. I. Hart	New York	May 9, 1900
33d	J. I. Hart	New York	May 10, 1901
34th	R. H. Hofheinz	Rochester	May 15, 1902
35th	R. H. Hofheinz	Rochester	May 14, 1903
36th	W. Jarvie	Brooklyn	May 13, 1904
37th	W. J. Turner	Brooklyn	May 12, 1905
38th	W. A. White	Phelps	May 11, 1906
39th	W. S. Rose	Schenectady	May 10, 1907
40th	L. Meisburger	Buffalo	May 8, 1908
41st	B. C. Nash	New York	May 9, 1909
42d	A. R. Cooke	Syracuse	May 10, 1910
43d	Ellison Hillyer	Brooklyn	May 5, 1911
44th	Charles F. Baylis	Oneonta	May [illegible] 1[illegible]
45th	Wm. W. Smith	Rochester	May [illegible] 191[illegible]
46th	Albert M. Wright	Troy	May 14, 1914
47th	Stephen Palmer	Poughkeepsie	May 13, 1915
48th	Robert Murray	Buffalo	May 12, 1916

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TRANSACTIONS

OF THE

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FORTY-NINTH ANNUAL MEETING

HELD AT

ROCHESTER, N. Y., MAY 1917

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OF THE

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OF THE

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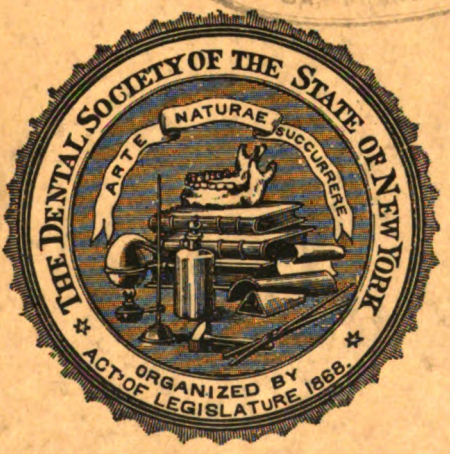

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HELD AT

ROCHESTER, N. Y., MAY 1917

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OF THE

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STATE OF NEW YORK

FORTY-NINTH ANNUAL MEETING

HELD AT

ROCHESTER, N. Y., MAY 1917

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TRANSACTIONS

OF THE

Dental Society of the State of New York.

FORTY-NINTH ANNUAL MEETING.

FIRST DAY—Morning Session.

THE forty-ninth annual convention of the Dental Society of the State of New York was held on May 10, 11, and 12, 1917, at Rochester, N. Y.

The meeting was called to order by the president, Dr. Robert Murray of Buffalo, on Thursday morning, May 10th.

The divine blessing was invoked by Rev. WALDO C. CHERRY.

President Murray then introduced the mayor of Rochester, Hon. HIRAM H. EDGERTON, who made the following

Address of Welcome.

Mr. President and members of the New York State Dental Society,—It has been my privilege upon a great many occasions in recent years to appear before conventions of this character and bid them welcome to Rochester. It seems to me it is very fitting that at this time you should hold your meeting here. We are grateful to you for coming. We old fellows are largely creatures of habit, and they tell me that for about fifty years you met in the city of Albany. We are grateful also to the city of Buffalo for waiving its claims and permitting you to come to us. We will let you go to Buffalo if you want to, once, but I think after this convention—at least if you had postponed it for a couple of weeks until all our gardens are in bloom, for they have been delayed this year—your conventions would be held hereafter in Rochester.

We have a very beautiful city. If you could be here in a couple of weeks from now, we would show you truly the Flower City. In the early days of Rochester we were called the "Flour City," because its chief industry was the manufacture of flour. Today, while that business is as great as it ever was, it is entirely overshadowed by other industries and has been almost forgotten. Later, Rochester became famous as a city where flowers grow.

We stand almost at the head of all the

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cities in the state in area and the beauty of our park system, having about 2000 acres of parks. One of our smaller parks, which we call Highland Park, is a bower of beauty all the year round. In two weeks from now there will be many varieties of lilacs there. I have seen on what is called "Lilac Sunday" 50,000 people in that park; then we have the rhododendrons. The first flowers that creep above the ground are in that park; there are there many hyacinths, and 300 varieties of trees—so that the place is well worth a visit. We trust you will not let your officers keep you too busy here, but that you will take time to go about Rochester and see some of the beautiful things.

It is almost impossible for a Rochesterian to understand why a New York State convention should go to any other city, and perhaps some of you may think so too, although I may be prejudiced. The Rochester people are a unit on Rochester. We may have some little differences among ourselves, but let anyone attack Rochester anywhere, and the whole city will fight.

We are pleased to have you here, and trust your convention will not only be profitable, but pleasing and entertaining, and I am sure you will want to come again.

I feel quite sure that wherever you go in Rochester you will find a hearty welcome. I trust you will go about and see us as we are, and I hope you will want to come back again.

Ladies and gentlemen, I thank you.

Response.

The mayor's address of welcome was responded to by Dr. W. W. WALKER, of New York, who spoke as follows:

Mr. President, ladies and gentlemen,—After the busy day yesterday at the dedication of the dispensary by our friend the mayor of this city, I thought this morning at breakfast that perhaps he would send his son, or one of his official family, and not come himself—but, Mr. Mayor, we are very happy to see you are the real mayor of this most beautiful city, and I know the city is proud of the manner in which you perform your duties, otherwise you would not be elected from year to year, as you are.

On behalf of the members of the Dental Society of the State of New York, and the visiting dentists from all over the United States, I thank you, sir, for this very cordial welcome. I also would thank the Chamber of Commerce for the very charming letter they sent the members, inviting them, and extending the good right hand of fellowship on this occasion. It said in that letter that they would give the dental profession an opportunity of catching on to what they called the " Rochester spirit." The Rochester spirit is the extending of the hand of fellowship to everyone who comes here. These conventions make everyone happy. You make us feel as if we were in your own home, and that is why Rochester has been so successful as a convention city. Everybody is welcome. The minute you arrive you are welcomed, and everyone is sorry to see you leave. That is the spirit of the citizens, the Chamber of Commerce, and the merchants—not for business only, but for pleasure.

Mr. Mayor and Mr. President, when this forty-ninth anniversary of the Dental Society of the State of New York has become ancient history, when it is a thing of the past, and you receive the printed Transactions of the meeting, you

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will realize for the first time in your life what a wonderful profession dentistry is, and what wonderful dentists you have in this town. I thought until this morning that the first dental clinic for the care of the teeth of the poor was started in Rochester, but I found out that about thirty-five years ago the first public dental clinic in the United States was started in Brooklyn. My friend Dr. Jarvie gave me that information; he said Brooklyn was not so slow, but that the administration in Brooklyn was slow. They gave $1500 the first year, but after that lost interest in the movement.

Then the activity was tranferred to Rochester, and as a result of the enthusiasm and interest in the movement displayed by the dentists of Rochester, one of your citizens has been farsighted enough to build this beautiful dispensary for the children.

There is another city that has done the same thing—the city of Boston. The idea probably started about the same time, and the Forsyth brothers have also built a beautiful dispensary in Boston for the same purpose as the one dedicated here yesterday.

In New York City, where we have the First District Dental Society, which numbers five or six hundred members, we have not yet been fortunate enough to have anyone build a dispensary for us; but we are fortunate enough to have dental clinics in the schools, hospitals, and the dental colleges—everywhere where it is possible to have one. I understand that the idea of "clean-up week" originated in Rochester. Next week is "clean-up week" in New York, and the children in the New York schools will be taught to clean their teeth.

The five hundred members we have in the First District divide themselves into sections, and form postgraduate courses for all dentists who wish to come in and study the branch of dentistry that perhaps they are not so proficient in. As soon as these classes are announced, they are filled at once with students—not dental students, but actual practitioners, who realize their shortcomings, and are willing to study in order that they may become more proficient in their work.

The dental and medical professions within the last year or two have told us that about one-third of the illnesses that flesh is heir to arise from diseased conditions of the mouth. The great surgeon of the middle West, Dr. Murphy, who died about a year ago, compiled a paper shortly before his death, which was read after his demise by his associate, in which he said he was of the opinion that many of the diseases of mankind arise from diseases of the oral cavity. Dr. Mayo of Rochester, Minn., another great surgeon, has said the same thing, and has also said that it was the dentists' duty to do their share in preventing disease. And the dental profession will do its share.

I thought after the remarks of yesterday that this taking care of the teeth of the children all over the United States will make the boys of the country better and greater and finer in every respect, and the girls will grow handsomer and healthier, bringing happiness to everyone.

Since I have been here, I have only heard three things talked about. The first thing is the care of the children's teeth; wherever you go you hear what these dentists have been doing for the growing population of Rochester.

Then the exhibits. I have seen many, but I do not think these can be beaten. I think Dr. Link—past-master of execu-

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tive officers—and his associates have done their share to make these exhibits successful.

The other subject is the matter of pulpless or devitalized teeth. New York is not the only state that is doing work of this kind. Take Ohio, the home of Callahan, for instance. Dr. Callahan has burnt more midnight oil and done more research work, and more hospital and infirmary work for the last few years than any other man in Ohio; and now he has perfected his methods, and will show us how to treat pulpless teeth and roots, and fill them. He is here to get partial payment for his labors; he is here to receive the Jarvie Fellowship gold medal, which I am sure will give him great pleasure, and we shall be glad to confer it upon him.

Mr. Mayor and gentlemen, I thank you very much, and I hope, Mr. Edgerton, you will live long and happily; and when you are tired of the mayoralty of this city, we will send you on to Albany, and then to Washington.

The vice-president, Dr. Amos C. Rich of Saratoga Springs, took the chair, while President MURRAY read his address. [See pages 66 to 74.]

The President's Address was referred to a committee which was instructed to report to the Executive Council.

President Murray then resumed the chair.

The President read a telegram from the Northern Ohio Dental Association, sending greetings to the New York Society, and inviting the members to meet with them on June 7, 8, and 9, at the Hotel Statler, Cleveland, Ohio.

Dr. W. W. SMITH, Rochester. Uncle Sam has been making demands upon us, and rightly so; members of the dental profession have been responding to these demands, and justly so. I am proud of the fact that dentistry has men of ability who stand ready to serve their country, but this has made great inroads upon our program, and it has necessitated a number of changes, especially in the clinics.

First, the program provides for a number of surgical clinics by some of our best oral surgeons, but we have received a number of communications, both by wire and letter, saying it would be impossible for them to give these clinics. Patients had been secured and were in readiness, and we have some very interesting cases, but it became necessary, on account of the fact that the surgical pavilion at the new dispensary was not available, to go to other hospitals, and we could not make the arrangements in time. We regret this very much.

In regard to the progressive lecture clinics, the program provided for these being held in the balcony, and large booths were to be prepared for this purpose. Conditions have arisen making it necessary to change this plan, and they will be held in another room, and instead of the audience moving from one booth to the other, the clinicians will move.

President Murray then made a number of announcements in reference to the program, after which the meeting adjourned to 2 o'clock.

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FIRST DAY—Afternoon Session.

The meeting was called to order by President Murray at 2.45 o'clock.

Dr. F. B. MOOREHEAD, Chicago, Ill., gave an illustrated lecture on the subject of "The Responsibility of the Dentist in the Management of Focal Infections."*

Dr. WESTON A. PRICE of Cleveland, Ohio, then addressed the society on the subject of "Some Studies on the Relation of Mouth Infections to Localized and Systemic Diseases."*

The society then adjourned until Friday morning at 10 o'clock.

* These two lectures were given extemporaneously, and are not published for the reason that the revised stenographic reports have not been received from the authors.—ED.

SECOND DAY—Morning Session.

The meeting was called to order at 10.45 A.M., by the president, Dr. Murray.

The PRESIDENT. The Correspondent, in his annual report, has taken up the question of "Radiography as an Adjunct in the Practice of Dentistry," and in the prosecution of this work he has propounded a certain number of questions which he has sent to the foremost minds in the profession throughout the country. The answers he has classified, and his report I feel will be an intensely interesting one at this time.

Dr. LEUMAN M. WAUGH, New York City, then presented the Report of the Correspondent. [See pages 75 to 90.]

Dr. L. A. TIMERMAN, Fort Plain. We have a little matter out of the ordinary to present, and I ask Dr. H. L. Wheeler, who cannot be here later, to explain it to you.

Dr. H. L. WHEELER, New York City. Dr. Timerman has had the good sense and good fortune to suggest that this society furnish to the Government a traveling dental office, to be sent to the front, or wherever the Government may need it. As I have been on the other side within the year, and have seen some of these in operation, I consented to speak to you on the subject. They are using in France—both in the English and French armies—an automobile with a portable chair and dental equipment, and a small laboratory for vulcanizing and doing mechanical work of various kinds, manned by a dentist and a laboratory man. In my opinion, it is the duty of every dentist in the country to make a list of all the available good laboratory men that the Government may have. It has been found necessary in Europe to mobilize the mechanical men, in order to give the necessary assistance to dentists who attend to the absolute needs of the

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soldiers in the trenches and the base hospitals. A traveling dental office at the front is necessary. No matter how good the condition of the mouth may be when the soldier goes to the front, the extreme privations he is subject to in the trenches and in battle bring dental troubles in sufficient quantity to keep the dentists busy in alleviating pain and distress. These dentists have the opportunity by being at the front to assist in keeping men in better condition than they would otherwise be if they did not have immediate relief from dental troubles.

I appeal to you to try to raise the money for not one only, but more if possible. I am going to Washington tonight, and shall see the Surgeon-general tomorrow, and it will give me great pleasure to tell him that we are interested in it, and will try to help in this way. You cannot all go to the front, and cannot all help to put the mouths of recruits in condition, but in this way you can do your bit, and get your patients to assist you.

I have been asked to give an idea of the cost of such a traveling dental office. I think that the Ford chassis is one of the best that can be used, because the heavier chassis gets stuck in the muddy fields and bad roads, and while a few men can jack up a Ford chassis so it can go ahead, they cannot handle the heavier ones so well. The whole thing should cost in the vicinity of from $2000 to $3000—probably with the Ford chassis it might be less. One generous man I know has offered to equip one, and pay for the driver throughout the war; but he being a man who likes to see things well done, and not consulting us, has already purchased a Pierce-Arrow chassis.

The equipment not only must be considered, but the cost of the upkeep. I am quite sure the Government will furnish the dentist and the laboratory assistant. Duplicate parts should be purchased at the time the original equipment is purchased, and there must be a chauffeur who is fairly well equipped to do the work. The ambulance drivers are put through a three months' course before they go to the front, and must show their ability to take the machines apart and put them together before they go out for active service. You must have a driver who is mechanically competent.

The meeting then adjourned to 2 P.M.

SECOND DAY—Afternoon Session.

The meeting was called to order by the president, Dr. Murray, at 3 P.M., Friday, May 11th.

The Report of the Committee on Practice, Dr. DANIEL H. SQUIRE, Buffalo, chairman, was read by Dr. Hoffman of Buffalo. [See pages 91 to 97.]

A paper by Dr. J. WRIGHT BEACH, Buffalo, entitled "Removable Hygienic Bridgework and Partial Dentures," was read by Dr. Frank W. Low of Buffalo. [See pages 98 to 103.]

The next order of business was the report of the Committee on Scientific Re-

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search, which was read by Dr. W. RAY MONTGOMERY. [See pages 104 to 106.]

Dr. Montgomery also read Dr. WM. J. GIES' report for the year 1917.* [See pages 107 to 111.]

Dr. Frank W. Low, Buffalo. Dr. Beach asked me to say a few words about the Preparedness League, but I doubt if it is necessary. I think the dentists of New York State are thoroughly alive to the importance of this work, and that it will go on successfully to its completion. I was present very recently at the meeting of the trustees of the League and the committee from the National Dental Association, and the reports were entirely satisfactory. There is, of course, a little friction here and there, but it is growing less. There are some dentists who think we should be separated from the Surgeon-general and his medical staff entirely, and have a staff of our own, as they do in Canada; but we believe it will do more to cement the friendship between the medical and dental professions if we can progress as we have been doing. So there will be no effort on the part of the Preparedness League to divorce ourselves from the Surgeon-general and his staff.

The status of the dentists in the army has been improved by recent legislation. A young man who goes into the army as a lieutenant with very much shorter service is likely to become captain, and later major, and in a reasonable length of service he may become lieutenant-colonel; and our men who stay in the service will have greater social position and greater emoluments.

The first examinations for the corps will have to be made by the dentists who are already appointed as dental surgeons. These are nearly all in Texas at present. There is one in New York, and one in California; but as soon as we get the appointment of others from the first examinations, they can in turn become examiners, so that an applicant will not have to go a great distance to take his examination.

MR. IRVING BROWN, a representative of the Dentists' Mutual Protective Alliance, addressed the members of the society on that subject.

The society then adjourned until the evening session.

* [The report by Dr. Gies for 1916, which was received too late for publication in the 1916 Transactions, is also printed in the present volume (see pages 112 to 143), at the request of the Society.—ED.]

SECOND DAY—Evening Session.

An informal banquet was held at the Powers Hotel, on Friday evening, at 7 o'clock. There was a large attendance, and a most enjoyable entertainment was provided. Dr. H. J. Burkhart acted as toastmaster.

DR. BURKHART. I wish to express, on behalf of the committee in charge, their

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very great pleasure and gratification in seeing so many present tonight. It is a most unusual thing for a State Society banquet to have over two hundred in attendance, and this marks a new era in State Society affairs.

I hope the dinner will be one of the functions at each annual meeting, in order to give the members an opportunity to get together, not for the purpose of listening to ten or fifteen toasts, but to listen to the two or three speakers specially selected for the occasion, and for another purpose which will be most pleasing to you. I want to personally congratulate the Local Committee on the splendid work they have been doing at this meeting, and I think you all have your hats off to the chairman of the Exhibit Committee, Dr. Link.

I take very great pleasure in presenting to you a gentleman who really does not need to be presented, because he has the right to present himself—our friend from Buffalo, the president of the New York State Dental Society, Dr. Murray.

Presentation of Fellowship Medal.

Dr. Murray, on behalf of the society, in presenting the Fellowship Medal to Dr. James R. Callahan, Cincinnati, Ohio, spoke as follows:

Dr. MURRAY. *Dr. Callahan,*—One of the important and delightful functions of our State Society meetings, made possible by one of our most highly esteemed and beloved members, Dr. Jarvie, is the ceremony of electing Fellows of the Dental Society of the State of New York.

Section 26 of the By-laws provides that—

The Committee on Nomination of Fellows shall, at each annual meeting, recommend to the Council the name of a dentist who, in their judgment, has contributed results of original research, or of one whose high attainments and high standing have been of such character as to have materially aided and advanced the science and art of dentistry.

Those recommended must be natives or residents of the United States or Canada. They shall be elected Fellows of the Dental Society of the State of New York in the same manner as is provided for the election of honorary members, and shall be awarded a gold medal of design and inscription approved by the society, which shall be paid for from the interest of the Wm. Jarvie Fellowship Gold Medal Fund.

By the authority vested in it by the by-law just read, this society has been signally honored in the past by being permitted in this impressive and tangible manner to honor some of the greatest scientists, some of the noblest and most lovable characters, in the dental profession on this continent.

To be permitted to have one's name enrolled as a Fellow of this society may not mean much to a man whose soul is aflame with devotion to his profession and whose time is fully occupied with the arduous and exacting duties of professional life; but to be permitted to have one's name added to the roster that bears the names of Black, Brophy, Darby, Jarvie, Miller, Talbot, Cryer, Jenkins, Andrews, Perry, Truman, Carr, Johnson, and Jackson is a distinguished honor devoutly to be desired, and an ample reward for a lifetime spent in the service of dentistry and humanity.

In selecting you, Dr. Callahan, as the 1917 candidate to receive this special mark of our esteem and love, the Committee on Nomination of Fellows had in mind your valuable services to dental science, and the self-sacrificing manner in which you have labored toward the solution of some of the most perplexing problems of our profession.

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Your efforts toward the standardization of root-canal technique have placed your name high up on the roll of honor among scientific investigators, and have won for you well-merited praise and recognition by organized dentistry throughout the world.

Of your past life, history informs us that you received a high-school education in Hillsboro, Ohio, a country town of 3000 inhabitants, near Cincinnati.

Being the son of an old-fashioned family physician with office and residence combined, you had ample opportunity to develop latent talent, which pastime took the form of rolling blue-mass pills, putting up quinin powders, reading medicine, and assisting in the surgical work that came to the office. It was here also you received your first instructions in sterilization, where hands and instruments were usually sterilized in the same basin or bucket or whatever was most convenient.

After being graduated from the Philadelphia Dental College in the class of 1876–77, and working in an office in San Francisco for about three years, you located in your home town, and in 1889 moved to Cincinnati, where during the early years of practice you took special courses in the medical college. On account of your deep interest in matters pertaining to your profession you were called upon and served your state and local societies in official capacities for more than twenty-five years. Your first important contribution to dental literature that commanded attention was a paper read before the Ohio State Dental Society in December 1893, entitled "Sulfuric Acid for the Opening of Root-canals." This paper, with slight modifications, was read before the New Jersey State Society in 1894.

About this time your researches on tin and gold in definite proportions for filling a certain class of cavities attracted attention.

Your more recent contributions to dental literature were papers entitled "Rosin as an Adjuvant in Root-canal Filling," read in New York City in 1914, "Root-canal Preparations," read in Brooklyn and Boston in 1915, and "Branching of Pulp-canals and Multiple Foramina," read before the National Dental Association at a later date.

These valuable additions to dental literature were the cause of your selection to fill more honorable and arduous positions relative to the prosecution of scientific investigations in the field of dentistry, hence your appointment to membership on the medical staff of the Cincinnati General Hospital as director of the dental clinic; and, as a mark of esteem and confidence of the National Dental Association, you were made a director of dental research on "Root-canal Problems" under the auspices of the National Dental Research Institute.

The character of a man is often judged by the company he keeps, and there is no better company than good books, and in this connection it is not surprising to learn that you have in your possession one of the most complete privately owned dental libraries in the United States.

It is said that every man has a hobby. This has the effect of not only maintaining a well-balanced mental equilibrium, but in your case furnished a profitable diversion from the exacting duties of professional life. We are credibly informed that your particular hobby is chicken-raising, in the prosecution of which you have accumulated some interesting data on this subject.

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The best means of determining a man's worth is the esteem in which he is held by those with whom he associates, and it is not surprising to learn that Dr. J. R. Callahan is a great favorite not only in his home city but throughout the entire continent.

This society congratulates you on the honor and distinction that has come to you in your efforts to serve humanity, and I esteem it a peculiar privilege and pleasure on behalf of organized dentistry in this state to present to you the Wm. Jarvie Gold Medal, and proclaim you a Fellow of the Dental Society of the State of New York, and we as a society greatly appreciate the opportunity this occasion affords of expressing to you in this manner our love and esteem for the great service you have rendered the profession of dentistry and to suffering humanity.

Dr. CALLAHAN, in accepting the medal, said:

It affords me a great deal of pleasure to announce to you that I have been informed that I am expected to make about a three-minute speech, because of the very full program for the evening. Not only should the speech be brief, but possibly it should be of the character that was indicated by a letter I received a short time ago from a Northwestern society, inviting me to come to their state meeting to read a paper, and saying they would pay my railroad fare and hotel bill. It was signed by the chairman of the executive committee, and it had as a postscript the following: "We would expect the paper to be worth the money it costs us." I replied on that occasion that I did not think I had anything that was worth the money, and I did not go.

On this occasion perhaps I should have said I had nothing that was worth the expense, but still I came.

The endowment of the Jarvie Fellowship I suppose was for the purpose of encouraging study on the part of the dentists, in order that we might better understand some of the problems that confront us. In my early life, when I first began to study dentistry, I received my first encouragement from a member of this society. It was before the old Mississippi Valley Association that I read a paper—my first paper. Jonathan Taft was present, and William H. Atkinson, and perhaps my friend Dr. Hoff, who is with us tonight. I think Dr. Hoff was just about able to walk alone at that time. Being my first attempt, and being quite a young boy, when I sat down I was in a perspiration, and I wished the floor would open up and swallow me. Dr. Atkinson came and sat near me, and put his hand on my shoulder, and said, "My dear boy, you are doing very well. Go on and study and work. Make the effort, and some day you will be able to write a good paper." [Laughter.]

Now Dr. Atkinson's society, the New York State Dental Society, has called me up and has said, "You are doing very well; keep it up."

If I do not appear to place proper estimate or value upon what has occurred in the last few moments, it is simply because I have not the words that are adequate to express my feelings, but I assure you I appreciate it very deeply. I feel that a greater honor has been conferred upon me than I ever dared to hope for. I thank you from the bottom of my heart, and I promise you I will endeavor to keep up the work as best I can.

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Dr. BURKHART. I have the great pleasure of breaking a little news to you, and of introducing the president of this society for the coming year, in the person of the president-elect of the Dental Society of the State of New York—Dr. Amos C. Rich of Saratoga Springs.

Dr. RICH. *Mr. Chairman, brother members, and friends,*—I appreciate this high honor more than I can say. My feelings are beyond what I could express to you. I hope I may be able to fill this office to the expectations of the members of this society, but to do that, I ask each and every one of you, and those who are not present tonight, to help me; and in turn I promise you to do the best that is within me. I thank you very much.

Dr. BURKHART. We would like to have a word from an old friend who has honored us with his presence tonight. He has been a guest of the Dental Society of the State of New York for many years.

I take great pleasure in asking my good friend Dr. Gaylord to address you.

Dr. E. S. GAYLORD, New Haven, Conn. *Mr. Toastmaster and gentlemen,*—It is quite a surprise to me to be called upon; but if ever I felt I would like to be able to make a speech, it is just at this moment. To be asked to be present at such a gathering as this is indeed a privilege that is well worth living for. To be able to attend for many years, as I have, your state meetings is always a privilege; to me it seems a duty, and I have often said I cannot afford to stay away.

It is a great satisfaction to be able to say even a word before such an audience as this. I knew before I came here that a good program would be presented. It is to be greatly regretted that that program has been interrupted, but the method of its interruption we all indorse for the sake of our dearly beloved country.

Now to digress a bit. I am known as the famous beggar of the National Association Relief Fund. I represent that committee, and I shall say just a word relative to that, because it is one of the things nearest to my heart. I want to live long enough to see $50,000 in the treasury, and then we will begin to aid the poor fellows who are suffering. Nearly half that sum is already in bank. The great work of the last year on your part has stimulated your committee to make efforts beyond former years, and if we all keep up in the manner we are doing—I hope this great calamity which has come over us will not interfere with it—one year more will complete that sum of $50,000.

I also want to extend to you our thanks in aiding us so nobly in purchasing the Christmas seals.

The society then adjourned.

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THIRD DAY—Morning Session.

The meeting was called to order by the president, Dr. Murray, at 11 A.M.

The PRESIDENT. We have about arrived at the end of our program, and it may with truth be said that we are about to consider one of the most important—if not the most important item on our program—the paper by one of our own members, Dr. JOHN R. CALLAHAN of Cincinnati, Ohio, who will speak to us on the subject of "Logical Asepsis in Dental Practice." [See pages 144 to 166.]

THE PRESIDENT. We now come to a very important matter, the purchase of a dental ambulance to be presented to the Government of the United States by the dentists of this state. It is a contribution in support of your government, and I want all who desire to contribute, who have not already done so, to give their names to the men who will pass up the aisles.

The report of the secretary of the Executive Council was then read. On motion, the report was received and adopted. [See pages 15 to 18.]

The next order of business was the installation of the newly-elected president, Drs. Messerschmitt and Meisburger escorting the president-elect to the rostrum.

Dr. MURRAY. Dr. Rich, it gives me great pleasure to welcome you to the chair, and I hope the coming year will be one of as intense interest and profit to you as the past year has been to me. In taking up the official duties, I did so with considerable misgivings. I did not have very much experience in wielding the gavel in such important organizations, but as the work of organization proceeded, and the interest among the various members became manifest, I began to feel at ease, and the very able manner in which the members of the profession throughout the state have risen to the occasion has indeed been a gratifying experience to me. I sincerely hope and trust that the support that was so freely accorded me will be accorded to my worthy successor.

I now hand you the gavel of authority, and wish you every success in the coming year.

Dr. RICH. Gentlemen, I am not a speechmaker. I shall attempt to do my duty as a presiding officer, but beyond that, I shall be very quiet.

The society then adjourned until the next annual meeting.

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MINUTES OF EXECUTIVE COUNCIL.

THE regular meeting of the Executive Council of the New York State Dental Society was called to order in Buffalo, N. Y., Wednesday, May 9, 1917.

The members present were Drs. Randall, Rich, Hoffman, Wheeler, Beach, and Hert. *Ex-officio members*—Drs. Murray and A. P. Burkhart.

A motion was carried that the reading of the minutes be dispensed with.

An adjournment was taken, to meet at Rochester at 8 P.M.

The meeting in Rochester was called to order by Chairman Rich.

The members present were Drs. Wheeler, Gould, Canaday, Randall, Rich, Beach, Hert, and Hoffman. Drs. Frazer, Whitmarsh, and Eshleman, alternates. *Ex-officio* members present were Drs. Murray and A. P. Burkhart.

Dr. Murray having resigned from the Council, Dr. Hoffman was elected to fill his unexpired term, and Dr. Eshleman was elected as alternate for the unexpired term.

The report of Dr. A. P. Burkhart, secretary, was read. A motion was carried that the report be accepted and arrangements for consideration of the recommendations be made by the chairman.

A motion was carried that the report as read be spread upon the minutes and upon the Transactions of the society.

A motion was carried that a vote of thanks be tendered Dr. Gillett for his excellent work in this state as chairman of the Scientific Foundation and Research Institute Committee.

The Treasurer's report was read, received, and referred to the Auditing Committee. The report showed a total cash for the year of $6906.63.

The report of the committee to procure complete records of the State Society proceedings was read.

A motion was carried that the report be adopted and spread upon the records of the society, with a vote of thanks extended to Dr. C. S. Butler of Buffalo, for the donation of a complete set of the proceedings of the New York State Dental Association since its organization.

A motion was carried that the volumes of proceedings donated by Dr. Butler be placed upon the shelves of the State Library at Albany, to be used as reference when desired.

A motion was carried that a committee be appointed from the Third District whose duty it shall be to have the subsequent proceedings of the State Society bound and deposited in the State Library, in order that the records of the society may be maintained in complete form, and Dr. J. W. Canaday, Jr., was made chairman of such committee.

The report of the Ethics Committee was read and received.

The report of the delegation to the National Convention was read, and a motion carried that it appear as a part of the records under the head of "committees."

The report of the trustee of the policy of the United States Fidelity & Guaranty Company, by Dr. J. W. Canaday, was read. The report shows 322 members insured under the blanket policy in New York State.

A motion was made by Dr. G. B. Beach, and carried, that the former chairman of the Committee on Liability Insurance, Dr. J. W. Canaday, as trustee of the policy of liability insurance, be continued for the next year with power; that he be requested to continue insurance with the same company, providing, after investigation, it is found by him to be satisfactory in its financial standing; that if

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the present contract is not deemed sufficient, he enter into another contract which shall be legal, on the same terms as last year; and that the bills of the committee for the last year be paid.

A motion was carried that the chairman of the Executive Council appoint a committee of three members from each district as a committee to act in connection with claims against the group members for indemnity insurance.

The report of the Committee on Scientific Research was read.

A motion was carried that the resignation of Professor Gies be accepted with regret, and that we extend to him a vote of thanks for the arduous work he has performed for us in the past, and express our appreciation of his services, and the hope that in the future we may be so situated as to again invite Professor Gies to direct the work.

A motion was carried that the State Society pledge itself to give $1 per member to the National Research Fund; that this money be raised, if possible, by request from the district societies for a separate contribution of $1 per member, several districts having already voted to contribute that amount; any deficiency to be paid from the state treasury.

A motion was carried that Dr. Link, chairman of the General Business Committee, be given such time as may be necessary to complete the business of this session which he may have under way, and he shall then render a report, and it shall be published. Dr. Smith of the Clinic Committee was also given extra time in which to render his report.

The report of the Legislative Committee was read and accepted.

A motion was carried that the chairman of the Legislative Committee be paid $25 for expenses incurred during the last year, and that he be requested to render a bill annually to this Council for expenses incurred in carrying on the work of the society relative to legislation in an amount not exceeding $50.

A motion was carried that the matter of dual membership in district societies be laid on the table.

A motion was carried that $200 be appropriated by this society to the Black Memorial Fund.

A motion was carried that the action of the First District in regard to a dinner to Dr. H. J. Burkhart be indorsed, and that this society co-operate by appointing a committee to assist in arranging the function.

The report of the Oral Hygiene Committee was read by Dr. L. A. Timerman, chairman; the report was received and ordered published.

A motion was carried that the Council recommend that the presidents of the different district societies of the state be requested to appoint five additional members to the Oral Hygiene Committee, with one of the present members to act as chairman of this committee, and the other present member to act as vice-chairman, and that the chairman of the Oral Hygiene Committee communicate with the presidents of the different district societies, suggesting such appointments.

Dr. L. A. Timerman, chairman of the Oral Hygiene Committee, addressed the meeting on the subject of purchasing and equipping a dental ambulance to be used at the front. A motion was carried that the Oral Hygiene Committee have an opportunity of going before the main session and presenting this matter and taking subscriptions, and that they be authorized to solicit subscriptions throughout the state for this purpose.

A motion was carried that the report of the Committee on Practice be read before the society by Dr. Hoffman.

A motion was carried that the report of the Committee on Scientific Research be read by Dr. Montgomery.

The bills of the session were presented and ordered referred to the Auditing Committee.

A motion was carried that the resolution of Dr. Low as to the discontinuance of union meetings be received.

A motion was carried that the Committee on Dentistry in Prisons and State Institutions be requested to confer with Dr. Terry, secretary of the State Board of Dental Examiners, concerning dental service in these institutions: that this committee be continued, and that they co-operate with Dr. Terry, the prosecuting officer.

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The report of the Budget Committee was read. A motion was carried that the report be received and laid on the table.

A motion was carried that Dr. Wheeler's report as chairman of the State Library Committee be sent to the secretary, and appear in the Transactions.

The Council adopted the suggestions contained in the following extract from a letter of Dr. Milliken relative to the appointment of a committee and the indorsement of the resolution, as follows:

"Hereafter the Dental Corps of the army shall consist of commissioned officers in the several grades as authorized for the Medical Corps, who shall have the same rank, pay, and allowances as officers of corresponding grades of the Medical Corps, including the right to retirement as in the case of other officers, and there shall be for every seven officers of the Medical Corps authorized by law one officer of the Dental Corps. Dental officers shall be proportionally distributed among the several grades as in the Medical Corps, and their promotion shall be governed by the laws governing promotion in the Medical Corps: *Provided*, that examining and review boards shall consist of one medical and two dental officers. Immediately following the approval of this act all dental surgeons then in active service shall be re-commissioned in the Dental Corps, in the grades herein authorized, in the order of their seniority, and without loss of relative rank in the army."

A motion was carried that a committee be appointed by the president and their names and addresses sent to the secretary, whose duty it shall be to take any action deemed desirable to forward the enactment into law of the provisions in this resolution.

A motion was carried that the secretary of the society be empowered to purchase for his use as secretary a typewriter and steel filing case, which shall be the property of the society.

A motion was carried that the secretary shall have authority to employ at intervals during the year, in view of the fiftieth anniversary, the services of a stenographer in connection with his work as secretary.

The report of the Committee on the President's Address was read. The recommendation therein contained relative to the amendment of Section 31 of the By-laws was approved.

A motion was carried that Section 31 of the By-laws be amended by striking out the following words: "At each annual meeting before adjournment."

The Fellowship Medal for this year is awarded to Dr. J. R. Callahan of Cincinnati, Ohio.

The report of the Law Committee, Dr. Carr, chairman, was read.

A motion was made by Dr. Wheeler, and carried, that the report be received and accepted, and that a set of resolutions be drafted, expressing the appreciation and thanks of the society to Dr. Carr for the years that he has served as chairman of the Law Committee, and that an engrossed copy be sent him. The financial portion of the report was ordered referred to the Auditing Committee.

Dr. Wheeler was appointed by the chairman to draft resolutions extending our thanks and appreciation to Dr. Carr, chairman of the Law Committee.

A motion was carried that Dr. Wheeler be given full power and authority to draft such resolutions, and to have a copy engrossed and presented to Dr. Carr on behalf of the society.

A motion was carried that the secretary of the society receive the usual honorarium of $200.

A motion was carried that the usual honorarium of $100 be paid to Dr. Butler, the treasurer of the society.

A motion was carried that the resolution which was adopted locating the fiftieth anniversary meeting in New York City in 1918 be reconsidered.

A motion was carried that the resolution locating the 1918 meeting in New York City be amended to read "Albany," instead of "New York," and that the fiftieth anniversary meeting of the society be held at the usual time in the city of Albany.

The report of the Auditing Committee was made, and accounts were found correct.

A motion was carried that the secretary be instructed to enter into a contract with the S. S. White Dental Mfg. Co. for publishing

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the proceedings of the society for the coming year on the same basis as the 1917 contract.

The report of the Registration Committee, by Dr. Conklin, was received, showing a registration of 500 members, and 294 guests.

A motion was carried that the Eastman Testimonial Committee be continued, and be asked to make further report at the meeting of 1918.

A motion was carried that a request be sent by the secretary to the Committee on Scientific Research, asking for a return to the treasurer of the State Society of all unpledged and unexpended funds in their possession that have been appropriated by the State Society, as shown by their report of this meeting.

The report of the Committee on Arrangements was read. A motion was carried that the report be received and accepted.

A motion was carried that the following resolution be adopted:

"*Whereas*, the sentiment of this meeting is against process patent exploitation; and

"*Whereas*, the Dentists' Mutual Protective Alliance is an organization whose purpose is to protect its members against process patents and other abuses; therefore be it

"RESOLVED, That we, the members in attendance, indorse the work of the Alliance and give it our support."

A motion was carried that a committee, consisting of the president, vice-president, and secretary, together with the Business Committee, when made, be an Executive Committee, with power, and that they make and supervise all arrangements necessary to a successful anniversary meeting of the society next year.

A resolution was adopted that the New York State Dental Society express their appreciation of the entertainment of the society in Rochester, and hereby tender a vote of thanks to all persons and organizations who have contributed in making this forty-ninth session one of the largest in attendance, and one of the greatest interest to our profession ever held.

ELECTION OF OFFICERS.

The following officers of the New York State Dental Society for the ensuing year were elected:

President—A. C. Rich, Saratoga Springs.
Vice-president—H. L. Wheeler, New York City.
Secretary—A. P. Burkhart, Auburn.
Treasurer—G. H. Butler, Syracuse.
Correspondent—Arthur W. Smith, Rochester.

The following were elected members of the Executive Council for the ensuing year:

First District—Arthur L. Swift, *regular;* James F. Hasbrouck, *alternate.*
Second District—Horace P. Gould, *regular;* W. N. Frazer, *alternate.*
Eighth District—Abram Hoffman, *regular;* M. Burton Eshleman, *alternate.*
Ninth District—A. W. Twiggar, *regular;* W. C. Fisher, *alternate.*

A motion was carried that we recommend the following to the Board of Regents for the appointment of Dental Examiners:

First District—William C. Dean, New York City; George Evans, New York City.
Third District—A. M. Wright, Troy; C. K. VanVleck, Hudson.

The recommendations from the district societies for the election of their committees for the ensuing year were approved. [See District Society Reports, pages 44 to 65; also Officers and Committees for 1917–18, pages 167 to 170.]

The following were elected delegates to the House of Delegates of the National Dental Association:

First District—Henry W. Gillett, *regular;* A. R. Starr, *alternate.*
Second District—Ellison Hillyer, *regular;* F. C. Walker, *alternate.*
Third District—J. W. Canaday, *regular;* A. M. Wright, *alternate.*
Fifth District—A. C. Bickelhaupt, *regular;* A. C. Heitzelberger, *alternate.*
Seventh District—W. W. Smith, *regular;* A. P. Burkhart, *alternate.*

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REPORTS OF OFFICERS AND COMMITTEES.

Report of the Secretary.

TO THE COUNCIL:

Gentlemen,—At the session of 1916 you directed the secretary to prepare for publication the amended By-laws, which were amended at the 1915 and 1916 sessions, and when properly revised to procure 2000 copies. Two thousand copies were gotten at a cost of $75; which is a very low figure, considering the increased cost of paper, ink, and labor.

A copy of the By-laws was inclosed with the preliminary circular issued by the secretary, and sent to each member of the State Society in advance of the official program.

There has been an unusual call for general information from dentists and exhibitors, showing clearly a decided interest in the present meeting. The hard work performed by the various local committees, notably by the chairman of the general committee, are real contributing factors for a successful meeting.

At a meeting of the Executive Council at Buffalo there was given to Dr. E. G. Link a free and unrestricted power in the management of exhibits and general arrangement for the forty-ninth meeting in the City of Rochester. No better man could have been selected. The freedom accorded him has acted as an inspiration, and urged him on to success in the difficult work intrusted to him. The working in harmony with committees of his own selection and the latitude allowed Dr. Link will mark the forty-ninth meeting of the society, in point of attendance, exhibits, and genuine fraternal spirit, the banner meeting of the State Society.

I desire to express my appreciation for the courtesies and reasonably prompt attention extended to me by the committees and general membership. I especially acknowledge the hearty co-operation afforded me by the president, Dr. Robert Murray, Dr. E. G. Link, chairman of the general committee, and Dr. W. W. Smith, chairman of the Clinic Committee.

The office of secretary of the State Society as it now exists is of much greater importance than it was a number of years ago. It now means more than the mere clerical or perfunctory duties necessary seven years ago, when the State Society had less than four hundred members, no connection with the National Dental Society of any consequence, or extensive business correspondence with sister state societies and the National Research Commission—now all added duties, and each one of great importance, which increase the duties of the secretary.

A secretary, in addition to clerical ability and initiative, must be diplomatic, and possessed of an immense fund of patience, therefore when co-operation on the part of brother officers and committees are forthcoming the duties of the secretary are more cheerfully and good-naturedly performed. The secretary under such conditions usually takes pride in the performance of his work, consequently reasonable office equipment should be furnished him. There should be placed in the office of the secretary a typewriter and filing case. Duplication of outgoing letters as well as incoming communications should be preserved.

I urge that you provide the incoming secretary with at least a machine. This is especially essential the coming year in view of the importance of the coming celebration of the fiftieth anniversary of the society, and consequent increase of business in the secretary's office. He should also be given authority to employ a stenographer for at least a portion of the year. I ask the Council to carefully consider the foregoing suggestions.

In addition I present the following: That the Secretary shall be unhampered in the preparation of literature, its printing and general distribution, and in power to fully co-operate with special committees to be appointed in the interests of the fiftieth anniversary. In addition he should be provided

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with funds for postage, expressage, and other essential expenses. The Council should also provide funds for the various local committees, upon whom will fall great responsibility and much labor. Undoubtedly the local committees will be made up from the New York and Brooklyn membership, and the Council must extend both financial and moral encouragement to said committees in order to make the fiftieth anniversary a success.

In accordance with the actions of the Executive Council at Albany last May the secretary entered into a contract with the S. S. White Dental Mfg. Co. for reporting, publishing and distributing the Transactions of the society for 1917, on the basis of the 1916 contract. The Transactions for 1916 were mailed to the membership and twenty-five additional copies furnished to the secretary for call and exchange in the future. The cost to the society for 1916 Transactions amounts to $101.92.

The secretary recommends that the incoming secretary be directed to enter into a contract with the S. S. White Co. for the 1918 session on the basis of the 1917 contract.

DR. WILLIAM GIES.

At the request of Dr. A. H. Merritt, chairman of the Scientific Research Committee, I had 1000 copies of Dr. Wm. Gies' final report for 1917 printed for distribution at the present meeting of the society. It is my understanding that Dr. Merritt will read the report. In this connection Dr. Gies offers his resignation as a member of the Scientific Research Committee, and I recommend that the request of Dr. Gies be granted.

For your information I present the following letter from Dr. Gies dated November 21, 1916.

NOVEMBER 21, 1916.

Dr. ARTHUR H. MERRITT:

Dear Dr. Merritt,—From the beginning of my association, in research, with the Committee on Research of the Dental Society of the State of New York, I have made it clear to the chairman that I could not accept, with professional propriety or with personal satisfaction, the necessity of publishing in the *Dental Cosmos* the official reports of our research. I stated that the papers from our laboratory were not published in trade journals, because we object to the impertinences of and demoralizations by trade influences in professional affairs, and because we do not intend to lend support to such influences, directly or indirectly, purposely or indifferently. I also said it was personally and professionally humiliating, in the distribution of reprints from such journals, to seem to be hucksters for the supply houses involved. Our objection is to the *system and its abuses, not to a particular journal representative of it.*

In presenting this objection to the publication of our first scientific report in *Dental Cosmos*, I learned of the apparent helplessness of the Research Committee in the matter of responding to my desire to publish our report, originally, in an independent journal; and then, confronted with the necessity of deciding either to go ahead under that embarrassment or to abandon the higher purpose to endeavor to be professionally useful to the society, I chose the latter alternative, in the conviction, and with the mental reservation involved in that belief, that it could not be long before the Dental Society of the Empire State would *feel* the professional impropriety of accepting financial favors from supply-house journals, and would not oblige or expect its investigators to submit their official reports to exploitation in trade journals. Five years have passed, and the situation is unchanged.

I now regretfully inform you and your associates of my desire to retire, next May, from my present relation with your Research Committee, and from my service in behalf of dental research under the society's auspices, because I am unwilling any longer to submit my reports of our work to original publication in the *Dental Cosmos* or in any other supply-house journal.

I take this action confident that the work of research now in progress under the society's auspices will be carried forward by others who are quite as eager as we are to proceed, but who may have less objection, for the present at least, to publication of their reports in the advertising periodicals of dental supply houses.

I shall continue to the end of our research year, and will prepare our next annual report, of course, without any change whatever in my attitude toward my obligations to you to the end of that period.

My relations with your committee and with its members individually have been continuously so pleasant and stimulating, and my attendance at the meetings of the State Society has been uniformly so profitable and agreeable, that I shall keenly regret the termination of official associations which have oc-

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casioned, for me, a wealth of personal and professional gratifications—remembrances that I shall always treasure.

Yours sincerely,

WILLIAM J. GIES.

The report of Dr. Gies given at Albany last May does not appear in the printed Transactions of 1916, because the report did not reach the printer until about April 20th of the present year, and unfortunately too late to be incorporated in the Transactions. As a mark of courtesy to Dr. Gies, I recommend that his report for 1916 and that of the present year be printed in the 1917 Transactions.

ASSOCIATION OF MILITARY SURGEONS.

I bring to your notice a letter from Dr. John D. Millikin, president of the Association of Military Surgeons, dated San Francisco, April 21, 1917, also an outline of certain resolutions he would be pleased to have the society adopt:

APRIL 21, 1917.

Dr. A. P. BURKHART:

My dear Doctor,—At the meeting of the National Dental Association last year at Louisville, the trustees recommended to the House of Delegates the inclosed draft of a bill, with a view of securing adequate recognition for our profession in the army.

This was unanimously approved by the House of Delegates. It is now desired that all state dental societies indorse it, and that a committee of active men be appointed through whom we can properly carry on our educational campaign.

Will you take the matter up at your state meeting on May 10th, 11th, and 12th, and have this done?

Simply have the bill read and a vote taken on it; or resolutions can be drawn similar to the inclosed draft, which, while a more elaborate way, is not necessary. All that is desired is that the State of New York go on record as being favorable to this advancement of the profession. After the indorsement of the bill request that the president appoint a committee, and that the names and addresses, together with the date of action on the bill, be sent to me. The state secretary or an ex-secretary would be a valuable man on such committee, as he usually can tell which members of the association have influence with people we may want to reach. These men we hope will later be able to support the National Dental Asociation's Legislative Committee, with several of your congressmen properly informed as to our needs in the way of legislation.

After the meeting will you not send a copy of the resolutions you pass to Senator James W. Wadsworth, Jr., and a copy to Congressman Charles P. Caldwell of your state, both of the latter being on the Military Committees—the committees that have to deal with such legislation.

Fraternally yours,

J. D. MILLIKIN, *President.*

Resolutions.

RESOLVED, That the New York State Dental Society heartily indorses the bill adopted by the National Dental Association on July 27, 1916, which seeks to so modify the status of the Dental Corps of the United States Army as to increase the efficiency of the dental service to the Government, and bring to an end the existing discrimination against the profession of dentistry in the public service; be it further

RESOLVED, That the members of the New York delegation in Congress be respectfully requested to lend their active support to the National Dental Association in its effort to accomplish this worthy object, and that the Legislative Committee and all other members of this society be instructed to use their best efforts to enlist the support of said members of the New York delegation in Congress in behalf of this work; and be it further

RESOLVED, That a copy of these resolutions be transmitted to Senator James W. Wadsworth, Jr., a copy to Congressman Charles P. Caldwell, and Dr. Otto U. King, general secretary N. D. A.

Draft of Bill.

Hereafter the Dental Corps of the Army shall consist of commissioned officers in the several grades as authorized for the Medical corps, who shall have the same rank, pay, and allowances as officers of corresponding grades of the medical corps, including the right to retirement as in the case of other officers, and there shall be for every seven officers of the medical corps authorized by law one officer of the dental corps. Dental officers shall be proportionally distributed among the several grades as in the medical corps, and their promotion shall be governed by the laws governing promotion in the medical corps: *Provided*, That examining and review boards shall consist of one medical and two dental officers. Immediately following the approval of this act all dental surgeons

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then in active service shall be re-commissioned in the Dental Corps, in the grades herein authorized, in the order of their seniority, and without loss of relative rank in the army.

Indorsed by the following:

Adopted by the Association of Military Dental Surgeons of the United States June 1, 1916.

San Francisco District Dental Society, June 12, 1916.

California State Dental Association, July 15, 1916.

National Dental Association, July 27, 1916.

Kentucky State Dental Association, July 27, 1916.

Oregon State Dental Association, August 3, 1916.

Virginia State Dental Association, October 6, 1916.

Connecticut State Dental Association, December 9, 1916.

Southwestern Dental Society, El Paso, Tex., January 22, 1917.

Minnesota State Dental Association, February 24, 1917.

I recommend that the Council adopt the suggestion of the appointment of a committee, also the indorsement of the resolutions accompanying Dr. Millikin's letter.

During the past year the secretary by letters and telegrams has been in frequent communication with the U. S. senators and congressmen from New York and other states relative to pending measures intended to further the recognition of the dental profession in the navy and army of the United States. The indications point to the final success of the reasonable demands of the dental profession.

RESEARCH INSTITUTE OF THE NATIONAL DENTAL ASSOCIATION.

I will now read extracts from the records of the Institute, March 16 and 20, 1917, and later a letter from Dr. Weston A. Price, dated April 17, 1917.

MARCH 16, 1917.

To the Members of the Research Commission, the Officers and Trustees of the National Dental Association and the Trustees of the Research Institute.

My dear Sirs,—I herewith submit a brief report of the joint meeting held on Saturday, March 10th, which report has been delayed by my absence from the city. There were present five members of the Board of Trustees of the Research Institute, five members of the officers and trustees of the National Dental Association, and eleven members of the Research Commission, several being on more than one board.

The following were present: Barber, King, Warner, Murphy, Gallie, Brown, Ward, Conzett, Allen, Hartzell, Logan, Petrequin, Burkhart, Price, Beman.

After thorough consideration of the matter of university affiliation, as suggested by the Carnegie Corporation, the following resolutions were unanimously adopted:

On motion of Dr. BURKHART, seconded by Dr. GALLIE:

"That this joint committee, composed of the representatives of the trustees of the Research Institute, the Research Commission, and the trustees of the National Dental Association, indorse the proposition that it is wise and expedient that there be an affiliation with universities, hospitals, and dispensaries for the carrying on of research work, and that the executive committee of the trustees of the Research Institute and the president of the National Dental Association are appointed a committee to consult with the officers of such universities, hospitals, and dispensaries to ascertain under what conditions such affiliation may be maintained. The Executive Committee and the president of the National Dental Association are directed to present such plans to the board of trustees of the Research Institute, the Research Commission, and the trustees of the National Dental Association for final action. The executive committee and the presidnet of the National Dental Association are also directed, when the plan is formulated, to submit the same to a mail vote of the trustees of the Research Institute and the members of the Research Commission."

On motion of Dr. BROWN, seconded by Dr. BURKHART:

"That the committee appointed in Dr. Burkhart's resolution be authorized to consummate some satisfactory arrangement with the Western Reserve University and local hospitals, reserving immediately the right to later take this same question up with other universities, hospitals, and dispensaries."

The matter of the effect on the membership of the National Dental Association of the passage of the amendment now before the House of Delegates was studied carefully, and at great length, and on motion of Dr. BURKHART, seconded by Dr. ALLEN, and unanimously carried, it was

RESOLVED, That it be recommended to the various state societies that their state dues be increased one dollar per member for the

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support of the Research Institute, which amount shall be paid directly to the treasurer of the National Research Institute; that we further recommend, in those states where the dues have been raised for this purpose, that the treasurer or secretary of each state be requested to forward all research funds raised for this purpose directly to the treasurer of the Research Institute.

In view of the fact that there has been an apprehension for fear of the passage of the amendment now before the House of Delegates making membership in the National contingent upon every state adopting the one-dollar dues plan for the Research department, and in view of the strong evidence that every state will early voluntarily adopt this plan, the writer moved, seconded by Dr. Hartzell,

"That it is the sense of this body that the motion just passed be understood to be the sense of this body as the action that should prevail in the National Association meeting in the next annual session."

The sentiment of the meeting seemed to abundantly demonstrate a unanimous appreciation of the need of a general and generous support for the Research department, and an important and vigorous campaign for the securing of ample funds.

On motion it was resolved that the resolution in reference to the increase in state dues for the support of the Research Institute be published in the next issue of the National *Journal*.

We will write you again very soon relative to a plan for a national campaign for raising endowments.

Yours very sincerely,

WESTON A. PRICE, *President*.

MARCH 20, 1917.

Dr. A. P. BURKHART:

My dear doctor,—You will be interested to know of important developments in the interest of the Research Institute of the National Dental Association, and will, we are sure, be glad to co-operate in every way you can to assist in the accomplishment of these ends and the further perfection and development of the department.

The trustees of the Research Institute have made formal application to the Carnegie Foundation for financial assistance. We have reason to believe that this application is being favorably considered, and largely because of the unprecedented and general support of the dental profession. They have, however, made definite recommendations for the improvement of the organization and staff, before taking final action. Accordingly, the trustees of the Research Institute, the officers and trustees of the National Dental Association, and the members of the Research Commission met in joint session in Cleveland, Saturday, March 10th, to consider the recommendations of the Carnegie Foundation, and to study means for the best possible development of the Research department. The recommendations were unanimously adopted.

The following resolution was also unanimously adopted:

"RESOLVED, That it be recommended to the various state societies that their state dues be increased one dollar per member for the support of the Research Institute, which amount shall be paid directly to the treasurer of the National Research Institute; that we further recommend, in those states where the dues have been raised for this purpose, that the treasurer or secretary of each state be requested to forward all research funds raised for this purpose directly to the treasurer of the Research Institute."

A campaign will probably be started in the very near future for establishing an adequate endowment, with which a competent and adequate staff can be maintained in the headquarters buildings for special problems, and with which to adequately support the various researches under grants. Researches are now being conducted in nine different cities.

We most earnestly solicit your active co-operation in the following: In securing the adoption, by your state, at the earliest possible opportunity, of the one-dollar increase in dues, for the support of the Research department. Nineteen states have already done so. Also, in seeing that this is remitted, as promptly as practicable, to the treasurer of the Research Institute.

In assisting us by your moral support in perfecting the Research department to the greatest possible degree, to the end that the dental profession may fulfil both its opportunity and its duty to humanity.

Yours very sincerely,

WESTON A. PRICE, *Acting Managing Director*.

APRIL 17, 1917.

Dr. ROBERT MURRAY, president, and Dr. A. P. BURKHART, secretary:

Dear Doctor,—We are so anxious to have your society go on record at its meeting, May 10th to 12th, by adopting the one-dollar increase in dues for support of the Research department, that we are almost counting the days. It is a matter of exceedingly great importance, because the pledges are running out, and it will be very disastrous to the

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work if we have to curtail it. The war situation may make it very difficult for us to get endowments, and the responsibility must be carried by the dental profession.

You will be interested to know that the Michigan State Society held its annual meeting last week, and unanimously changed its constitution, providing one dollar additional dues for the support of the Research department. Incidentally, several members who had not subscribed before desired to do so, contributing five hundred dollars in cash and new pledges.

We are looking forward with much interest to the action that will be taken at your meeting.

We are writing this letter to each of you.

Yours very sincerely,

WESTON A. PRICE, *Acting Managing Director.*

The National Research Institute you will note is anxious that the New York State Society at its present session go on record to pay to the Institute this year $1 per member, and a like amount per member annually thereafter for 1918, and so on.

At the 1916 session our By-laws were amended, increasing the dues for the use of the National Association from $1 to $2 per member annually. The amendment also provided that the State Society for its use receive annually $2 per member instead of $1 as heretofore. In other words, the district societies, beginning with the present year, are paying into the state treasury $4 per member instead of $2.

If the request of the Research Institute is granted the society must pay to the National $3 instead of $2, which will leave in the hands of the State Society $1 per member instead of $2, as contemplated in the amendment of last year. I have explained the situation at some length in order to clearly place the situation before you.

In giving thought to the request of the Research Institute for the present year and yearly hereafter, the fiftieth anniversary also confronts the society, and funds for its fitting observance must be on hand. Both propositions must receive earnest and careful consideration.

THE NATIONAL DENTAL JOURNAL.

Under date of April 27th I shall read for your information a letter from Dr. Otto U. King, secretary of the National Dental Association.

APRIL 27, 1917.

Dr. A. P. BURKHART:

Dear Dr. Burkhart,—This is to officially notify you that the May issue of the *Journal* is the last one that will be sent to members of your State Society who have not paid their 1917 dues. Beginning with the June issue, there will be no more sample copies of the *Journal* furnished gratuitously. We make this announcement to you and your society in order that there may not be any misunderstanding or confusion on the part of some, who may be disappointed when they find that they are not receiving the *Journal of the National Dental Association.* We would like also to urge you to send letters to all of your delinquent members, advising them of this notice you have received from the officers of the National Dental Association. Also inform them that it may be impossible to supply anyone with the back numbers of the *Journal.* Therefore, unless they immediately pay their 1917 dues, they may be disappointed in not being able to obtain a June or July issue of the *Journal.*

The enormous increase in the cost of publishing the *Journal*, owing to war conditions, makes it necessary to practice the most rigid economy, and since we have already sent to delinquent members four sample copies of the *Journal of the National Dental Association* for 1917, we feel that we have about exhausted our missionary spirit.

Trusting that you may be able to harvest in a large number of delinquent members, and with best wishes, I am,

Fraternally yours.

OTTO U. KING, *Sec'y.*

An effort was made to procure reduced railroad rates, but the request was denied, much to the regret of the secretary and the general committee.

The following constitutes the expense of my office, minus cost of stationery. All stationery was furnished to members of committees by the secretary, with the exception of the Oral Hygiene and the general business committee of the present year.

EXPENSES.

Stenography, addressing, stamping, and filling envelopes	$19.75
Phone and telegraph messages, engraving, gavel, expressage, postage, and miscellaneous articles	69.33
	$89.08

Herewith find attached bill for reference to the Auditing Committee.

Respectfully submitted,

A. P. BURKHART, *Sec'y.*

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Report of the Treasurer.

ROCHESTER, N. Y., May 7, 1917.

TO THE COUNCIL:

Gentlemen,—The treasurer respectfully presents for your consideration the attached report:

The dues from the district societies show our total membership to be 1636, which is an increase over last year of 165.

We have a bill from Dr. Carr for expenses as chairman of the Law Committee, for $762.88, on which there was only money enough in the law fund to pay $381.88, which leaves a balance due him of $381.00.

The term of my office as treasurer having expired, I respectfully ask that I shall not be re-elected.

"A" SOCIETY FUND.

Receipts.

Cash balance from 1916	$3185.27
Additional 1916 dues from Fourth District	4.00
Additional 1916 dues from Seventh District	2.00
Expense check returned by Dr. B. S. Hert	6.42
Oral Hygiene Committee	200.00
Exhibit Committee	541.14
Banquet Committee	20.35
Interest on deposits	62.73
Sale of old chairs	1.25
First District dues	1972.00
Second " "	1100.00
Third " "	316.00
Fourth " "	336.00
Fifth " "	472.00
Sixth " "	384.00
Seventh " "	560.00
Eighth " "	760.00
Ninth " "	344.00
	$10,267.16

Disbursements.

Expenses of essayists	$410.00
Expenses of clinics	56.85
Committee on Scientific Research	500.00
Legislation Committee	66.66
Expenses of other committee members	94.26
Typewriting	51.12
Printing programs	149.16
Correspondent's expenses	24.00
Secretary's expenses	87.15
Treasurer's expenses, including bond	21.19
Registrar	6.00
Hotel Ten Eyck, entertaining guests	$32.83
Secretary's honorarium	200.00
Treasurer's honorarium	100.00
Badges	28.87
Storage and cartage	13.50
S. S. White Co., for reprints	53.00
Dues to National Dental Association	1471.00
Balance in bank	6901.57
	$10,267.16

"B" LAW FUND.

Receipts.

Balance from 1916	$256.96
From First District	700.00
From Educational Department	700.00
	$1656.96

Disbursements.

Retainer and expenses for Mr. Purrington	$733.62
Expenses of Dr. Carr	923.28
Cash balance	.06
	$1656.96

"C" JARVIE MEDAL FUND.

Credits.

Balance from 1916	$5.00
Interest from bonds	50.00
Bonds	1250.00
	$1305.00

Debits.

Medal for 1917	$50.00
Bonds	1250.00
Cash balance	5.00
	$1305.00

RECAPITULATION.

Receipts.

Total balance 1916	$3447.23
Society Fund (A)	7081.89
Law " (B)	1400.00
Jarvie " (C)	50.00
	$11,979.12

Disbursements.

Society expenses 1916–17	$3365.59
Legal expenses	1656.90
Medal	50.00
Total cash balance	6906.63
	$11,979.12

G. H. BUTLER, *Treasurer.*

Examined and found correct:

C. A. BRADSHAW,
H. D. WHITMARSH,
B. W. WHIPPLE.

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Report of the Law Committee.

Mr. President and Gentlemen,—At the request of the Executive Council, and with the approval of Dr. Downing, I have completed the work which I had begun as chairman of the Law Committee, and also the new material on hand up to the time when the Regents were to take charge of prosecutions under the new law. I will substitute a report of Mr. Purrington's upon the work done, instead of giving one myself.

fused to identify him. These cases are tabulated in Annex "A."

Complaints were drawn up in three other cases, but the agents could not secure the attendance of the witnesses, and warrants were not issued.

Fines due to the society and unpaid at the date of the last report, amounting to $700, have been collected and sent to the treasurer. They are tabulated in Annex "B."

ANNEX "A."

Cases initiated after May 6, 1916.

NAME.	COUNTY.	DATE OF WARRANT.	RESULT.
Perkins, Josiah F.	Kings	July 8, 1916	Fined $100.
Walsh, Edward H.	New York	" 12, "	Fifteen days' imprisonment.
Gershon, Irving	Kings	" 27, "	Sentence suspended.
Perropontis, Miltiades	New York	" 31, "	Acquitted.
Stagg, Leonard	"	" 20, "	Sentence suspended.
Reiner, John	"	Aug. 4, "	Fined $50.
Asfar, Joseph	Kings	Sept. 5, "	Acquitted.

Report of Counsel.

MAY 1, 1917.

Dr. WM. CARR, Chairman Law Committee.

Dear Dr. Carr,—I have the honor to report legal matters transacted under my retainer of the State Dental Society through you from May 1, 1916, to September 1, 1916, when the new law took effect, and since that time in finishing pending matters.

Seven illegal practitioners were arrested between May 1st and September 1st, three in Kings County, four in New York. Five were convicted. One was fined $100; another was fined $50; one was imprisoned for fifteen days. Sentence was suspended in two cases, and two were acquitted. Of the acquittals, one was a Greek, by name Perropontis. On his trial it transpired that the corroborating witness had written to defendant offering in his behalf to change his testimony. The other, a second offender named Asfar, was saved by the complaining witness, who re-

ANNEX "B."

Fines collected after May 6, 1916.

Martin, Leon	$200
Jaulus, Alfred N.	100
Koegelmeier, Albert	50
Lief, Max R.	100
Gilman, Eli	100
Oleson, Walter	50
Warner, Robert L. L.	100

At the date of the last report, there were four cases pending. Two were discharged upon their own recognizance because of the failure of the witnesses to appear. This means that the cases could be restored to the calendar if the witnesses were found. The other two, Waterbury and Lopatin, were held by the magistrate before whom the proceedings were conducted by this office. The trials were conducted by the district attorney of Kings County, and both men were acquitted. I have heretofore called your attention to the fact that the district attorney of Kings

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County has made it a rule to have all cases tried by his office. In New York County, my office has tried the cases. The names of these defendants are tabulated in Annex "C."

ANNEX "C."

Cases pending May 6, 1916, and their disposition.

NAME.	COUNTY.	RESULT.
Kessler, Jacob	New York	Discharged on own recognizance.
Santora, Frank	"	" " " "
Waterbury, Harry H.	Kings	Acquitted.
Lopatin, William	"	"

There are $285 of fines imposed in Greater New York still due. The city comptroller refused to pay them to the society, although they were imposed prior to September 1st, taking the ground that under the new statute they were payable to the State Board of Dental Examiners. This view of the law, in my opinion, is erroneous. The secretary of the board, however, expressed willingness to apply for them and pay them to the society when collected. It seemed quicker and cheaper to assent to this procedure instead of initiating proceedings to compel the comptroller to pay them directly to the society. These fines are set out in Annex "D." One of them

ANNEX "D."

Scheld, William (Balance due of $200 fine)	$35
Berger, Henry	100
Reiner, John	50
Perkins, Josiah F.	100

is a balance of $35 from a fine of $200 imposed on William Scheld in 1914. The court allowed defendant to pay in instalments. He paid $165, and disappeared.

Upon your complaint I conducted before the comptroller of the State of New York a proceeding to revoke the license of Waldo J. Morse, Jr., as a private detective. This man was employed as an agent of the society upon representations, never borne out, that he knew of 163 unlicensed dentists in Brooklyn. Shortly after his employment I advised his discharge; he did not give a list of dentists demanded from him, and was so boisterous that I ordered him from the office. After you discharged him, he made defamatory statements affecting the society, yourself, myself, and other persons. He induced Mr. Martin McCue, a member of the Legislature, to introduce a resolution providing for the investigation of the society, making in support of it false statements that were privileged, being made before a committee of the Legislature. The resolution was referred to the Ways and Means Committee, which never reported it, being satisfied presumably that it was predicated upon unfounded statements.

It seemed necessary for the credit of the society and its officials to bring Morse before a tribunal and compel him to substantiate his defamation or take the consequences. The most feasible procedure was one before the comptroller to revoke his license. Slander is not a criminal action, and in a civil action he could not presumably have responded in damages, as he had avoided payment of costs in such an action by taking the pauper's oath. As his defamation was not in writing, the law of criminal libel could not be invoked.

The proceeding before deputy state comptroller William Boardman began on March 13, 1916, was adjourned from time to time, and was concluded on May 9, 1916. The record covers 1500 typewritten pages. Morse was given every opportunity to substantiate his calumnies; he utterly failed to do so. The deputy comptroller's opinion was given January 20, 1917—see Annex "E" [page 28]. It found that Morse had "wilfully and maliciously and without cause made charges of fraud and corruption against the complainant herein and his counsel (meaning you and me); that such charges had been made with a reckless disregard of the truth, based on

page 29

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ANNEX "E."

Copy of the order of the COMPTROLLER OF THE STATE OF NEW YORK *revoking the license of* WALDO J. MORSE, JR., *as a private detective.*

STATE COMPTROLLER'S OFFICE,
NEW YORK CITY.

In the Matter of the Complaint of WILLIAM CARR *against* WALDO J. MORSE, JR., a licensed private detective.

AFTER hearing all the testimony and upon due consideration thereof and of the proofs offered in the above entitled proceeding it appears to my satisfaction:

First. That on or about the 16th day of September 1913, the respondent, Waldo J. Morse, Jr., was duly licensed by the Comptroller of the State of New York to engage in business as a private detective under authority of chapter 25 of the laws of 1909 as amended, and has since been engaged in business as a private detective in the county of New York and elsewhere.

Second. That on or about the 11th day of August 1915, the respondent, said Waldo J. Morse, Jr., at a hearing in a criminal proceeding held before Hon. Clarence S. Houghton, a United States Commissioner for the Southern District of New York, the said Waldo J. Morse, Jr., being then and there sworn as a witness in a criminal proceeding, did testify falsely to a material fact, to wit, in response to a question as to his reasons for leaving the employ of the State Dental Society of the State of New York, and having been asked, "Were you dismissed from that position?" replied, "No, I quit because they wanted me to be their collector in Brooklyn on graft."

Third. That in his application for a detective license addressed to the Comptroller of the State of New York, said Waldo J. Morse, Jr., neglected to reply fully and frankly to questions asked thereon, in that in reply to question No. 9 he failed to state the names of his latest employers, and in reply to question No. 16 he failed to mention his arrest on a charge of assault preferred by one Waltaire.

Fourth. That at various and sundry times and to many persons the said Waldo J. Morse, Jr., has wilfully and maliciously and without cause made charges of fraud and corruption against the complainant herein and his counsel; that such charges have been made with a reckless disregard of the truth, based on mere rumor and hearsay, and have been proven before me to be false and without foundation.

Fifth. That the conduct of said respondent as specifically described in the preceding paragraphs indicates that he is not a competent or proper person to conduct the business of private detective under license from the State of New York.

It is, therefore, ordered, that the license of the said Waldo J. Morse, Jr., to engage in the business of private detective be and the same is hereby revoked pursuant to section 73 of chapter 25 of the laws of 1909 as amended, and the said Waldo J. Morse, Jr., is hereby ordered to surrender to the Comptroller of the State of New York, on or before the 25th day of January 1917, license No. 536, bearing date of September 16, 1913, issued to said Waldo J. Morse, Jr.

It is further ordered that, on or before the 25th day of January 1917, the said Waldo J. Morse, Jr., surrender to the Comptroller of the State of New York private detective badge No. 51, in accordance with the aforesaid section 73 of chapter 25 of the laws of 1909 as amended.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of the comptroller of the State of New York this 20th day of January, 1917.

WM. BOARDMAN,
[SEAL] *Deputy Comptroller.*

County of New York, } *ss.:*
State of New York, }

Dorance E. Copping, being duly sworn, deposes and says:

That he is employed in the office of the State Comptroller, at 223 Broadway, Borough of Manhattan, City of New York, and has compared the above instrument with the original order on file in the office of the State Comptroller, and that the above instrument is a true and correct copy of the original order revoking the private detective license of Waldo J. Morse, Jr.

DORANCE E. COPPING.

Sworn to before me this 24th day of January, 1917.

WM. L. HERBERT, *Com'r of Deeds,*
New York County.

Reg. No. 18143. County clerk's No. 370.

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mere rumor and hearsay, and have been proven before me to be false and without foundation." It also found that Morse "is not a competent or proper person to conduct the business of private detective under license from the State of New York," and ordered the revocation of his license.

Mr. Morse is seeking to review the proceedings by writ of certiorari. In order to do this, he will have to print the record, which will cost probably $1000 and upward. In order to procure funds for prosecuting this proceeding, he is soliciting aid through the *Dental Outlook*, organ of the Allied Dental Council, which employed him after his discharge, and otherwise, from unlicensed as well as from licensed dentists. I understand that he has been notified by the attorney-general that unless he prints the record shortly, motion will be made to dismiss his appeal.

The cost of this proceeding has been considerable. The stenographic notes cost $448.50; printing the briefs $27.25; printing copies of the order $3.50—in all $479.25. This money I advanced and you repaid it to me, excepting $3.50 for printing the order. These matters are disbursements only, and do not cover charges of counsel.

In the course of the Morse proceeding, he subpœnaed as witnesses in his behalf Dr. Solomon P. Ratner, delegate of the Eastern Dental Society to the Allied Dental Council, and chairman of the legislation committee of that council, which employed Morse as its agent; also Dr. Moses Gang. It transpired in the testimony of these men that Morse, as the council's agent, had caused the arrest of one D'Leen, previously thrice convicted on this society's prosecution. Upon D'Leen's trial, Moses Gang, then a dental student, testified in defendant's behalf that he had done the work that D'Leen was charged with doing. Morse telephoned this information to Dr. Ratner, who sent for Gang, and, as he says, pointed out to him the error of his ways. Gang testified that he understood from Morse and Ratner that if he recanted his testimony he would be safe, but that unless he did so he would not get his dental license. He did make affidavit before the district attorney of Kings County recanting his testimony in D'Leen's behalf. Dr. Ratner reported the case in the *Dental Outlook*, saying, among other things, "We have immediately taken steps to break up this alibi, and if possible to show that perjury was committed."

He also said of Gang, whom he describes as "the self-confessed young man," that "he realized the great wrong he has committed—a future member of a profession to try and help a criminal." He admitted that he had only known Gang from February to June 1915, in connection with these charges. Nevertheless, in June 1915 he certified to the Board of Regents that he had known him for two years, that he was of good moral character, and worthy to be licensed to practice dentistry. Upon these facts, you lodged complaint with the board of unprofessional conduct on the part of Dr. Ratner. The board sustained the charges and directed the suspension of Dr. Ratner from practice for one year. That action, under the statute, came before the Board of Regents, which has, as I am informed, confirmed the board's action and suspended Dr. Ratner for a year.

I appeared before the board upon two hearings in the Ratner case, and once before the regents. My actual disbursements for these attendances were $41.90; the cost of the brief submitted to the board was $21.56, making total disbursements of $63.46.

There have been other matters upon which I have been called upon to act, with the detail of which it is not necessary to enlarge this report. The new law, if carried out, will provide annually an income far in excess of any that has ever been at the disposal of the society, growing largely out of the annual registration of dentists. Whether the results will be commensurate remains to be seen. The new law contains a definition of dental practice which will have to be interpreted by the courts. It allows dental practice by corporations, thus going against the rulings of the courts, and authorizing what before its enactment was illegal. I have no desire to criticize the act, but desire to make it clear that I am not responsible for either its merits or its defects.

My chief compensation for the years spent in endeavoring to advance the interests of your profession by securing with you the enactment of legislation and endeavoring to enforce it fairly and honorably has been the personal association with yourself, and our long and enduring friendship, and it has been

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a great pleasure to know that your efforts have been appreciated, not only by the Dental Society of the State of New York, but by your profession at large both in this country and abroad.

I remain, my dear doctor,

Very sincerely yours,

W. A. PURRINGTON.

Financial Report.

The receipts and disbursements from May 6, 1916, to December 1916, are as follows:

City warrants forwarded by Dr. Wm. Carr to Dr. G H. Butler, treasurer, from May 6, 1916, to June 29, 1916:

May 29, 1916	$450.00	
June 29, 1916	250.00	
		$700.00

Amounts paid by Dr. G. H. Butler, treasurer, to Dr. Wm. Carr, chairman:

June	2, 1916	$184.05	
July	6, "	181.50	
Aug.	23, "	181.70	
Aug.	31, "	330.25	
Sept.	14, "	211.15	
Oct.	2, "	186.37	
Dec.	16. "	381.88	
			$1656.90

Paid Mr. Wm. A. Purrington, retainer and disbursements, from May 6, 1916, to Dec. 16, 1916. as per vouchers $1115.50

Paid by Dr. Wm. Carr, chairman, to Miss Adelaide H. Staunton and Mrs. Banks and to C. D. McNerney, detectives for the State Society, for services, carfares, witness fees, county clerks' certificates, photographs, fees for patients, etc., from May 6, 1916, to Dec. 5, 1916, as per vouchers $541.40

SUMMARY.

Mr. Wm. A. Purrington	$1115.50
Miss Staunton and others	541.40
	$1656.90
Balance due Mr. Wm. A. Purrington on my receipt for $762.88 held by Dr. G. H. Butler, treasurer	$381.00
Printing brief *in re* Ratner	21.56
Trip to Albany, March 1, 1917, *in re* Ratner	14.50
Balance due Mr. Purrington	$417.06
Paid by Dr. Wm. Carr, chairman, to Miss Adelaide H. Staunton, Mrs. Helen C. Mott, C. D. McNerney, detectives for the State Society, for services, carfares, witness fees, county clerks' certificates, photographs, fees for patients, etc., as per vouchers	$98.70
Balance due Dr. Carr as per last year's report	5723.15
Total balance due Dr. Carr	$5821.85

In addition to this Mr. Purrington gave his services without charge to the society in the prosecution of Morse and Ratner. The copies of the stenographic notes in the Morse case, $448.50, printing the brief $27.25, and for Burns detective services, and one other detective, $350.00, I paid for and have not charged to the society. $3.50 was paid by Mr. Purrington for printing copies of the order.

You will therefore see that the prosecution of Morse and of Ratner did not cost the society anything, although it was in defence of officers of the society.

Respectfully submitted,

WILLIAM CARR, *Chairman.*

Examined and found correct:

C. A. BRADSHAW,
H. D. WHITMARSH,
B. W. WHIPPLE.

Report of Dental Research Finance Committee.

TO THE COUNCIL:

The New York State Dental Research Finance Committee, working through the district members, reports as follows:

The chairman has endeavored to interest the different districts to make new or increased subscriptions to the National research funds. The net results have been that the First District Society has increased its annual subscription to $300, and has forwarded that amount directly to Dr. Price; the Second District Society has added $1 to its annual

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dues, for the purpose of contributing yearly $1 per member to the funds of the Research Commission, beginning with the current year. The Fifth District contributed $100, which has been forwarded to Dr. Price.

The committee has received no other subscriptions.

Respectfully submitted,

HENRY W. GILLETT,
Chairman.

Liability Insurance Committee.

Rochester, N. Y., May 10, 1917.

TO THE COUNCIL:

Gentlemen,—The United States Fidelity and Guaranty Co. Committee respectfully presents for your consideration the attached report:

A year of labor and some travail has resulted in the development of an insured indemnity group within the society of 322 members, according to my latest advices from the U. S. F. & G. Co., and a further list of about 30 who have made application for insurance, and will join the group when their present policies expire, some time during the current policy year. The policy covering members of the Executive Council was issued June 20, 1916, as all members of the Council had made their application before that date.

As indicating the liberal policy of the company toward the State Society, I may mention that when the general group policy was issued August 15, 1916, it was based on a membership of less than 150 instead of the contract number, which was 250. I suggested this early issue of the policy, as I found I was likely to be swamped by the correspondence which was developing on account of delay in reaching the prescribed number. As much as possible of the necessary correspondence of the committee was turned over to the Liability Company, and consequent delay has occasioned some criticism. As it is, I have put in the hours which would represent a month's work in attending to the duties of the committee.

In March Dr. O. S. Long of Brooklyn advised me by telephone that he had a threat of litigation on account of dental services, but I have had no further information in the case, although I asked the company to advise me regarding it.

On April 16th the company sent me a copy of claim made against Dr. Cortez J. Mapp, Brooklyn, which is attached to this report.

The chairman of the Council appointed the necessary committee of policy-holders to act for the society in this case.

I suggest that a standing policy-holders' committee in each district be named at the annual meeting, and names of the committees and their addresses be sent to the trustee of the policy or the indemnity company, so that notification may be sent of such appointment, and help to avoid delay when claim for damages is made against a group member in any district of the state.

J. W. CANADAY, *Trustee.*

Report of the Committee on President's Address.

ROCHESTER, N. Y., May 10, 1917.

TO THE COUNCIL:

Gentlemen,—The Committee on President's Address has read with care the text of the address, and are glad to report that it is a strong, masterly, and attractive presentation of the doings and accomplishments of dentistry for the recent past, and is rich with suggestion and inspiration for the future. It contains a number of recommendations which are worthy of your active consideration.

We call your attention to the following recommendations:

"That section 31 of the By-laws be amended to read as follows: The society shall hold its annual meeting commencing on the second

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Thursday of May in each year at 10 A.M., and such other special meetings as may be necessary. The Executive Council shall name the next place of meeting."

"I would respectfully recommend that this society tender Dr. Butler, through its secretary, its sincere thanks for this valuable gift."

"I would also recommend that these volumes be placed in the State Library at Albany, in order that the members of this society may use them as a reference when desired."

"I would further recommend that a committee of one be appointed from the Third District, whose duty it shall be to have subsequent numbers of the State Society Transactions bound in suitable form, and deposit same in the State Library at Albany, in order that the records of this society may be maintained in complete form."

Respectfully submitted,

ALBERT W. TWIGGAR,
H. D. WHITMARSH,
Committee.

Report of the Oral Hygiene Committee.

ROCHESTER, N. Y., May 7, 1917.

TO THE COUNCIL:

Gentlemen,—The Oral Hygiene Committee respectfully presents for your consideration the attached report:

Owing to the epidemic of poliomyelitis last fall, which seriously interfered with all public gatherings and was also the cause of the late opening of many of our public schools, the Oral Hygiene Committee was unable to commence its series of lectures as had been planned at the annual meting of the dental society of 1916. At that time it was decided that the efforts of the committee should be directed largely along educational lines. This has been carried out as far as possible, but the committee as a whole has not lived up to the high hopes entertained at our session last year.

By the co-operation of the State Educational department with the Oral Hygiene Committee arrangements were made for a lecture at each of the normal schools of the state, namely, Albany, Dr. A. C. Rich; Plattsburg, Dr. M. J. Terry; New Paltz, Dr. Stephen Palmer; Cortland, Dr. W. A. White; Brockport, Dr. H. F. Tanner; Geneseo, Dr. F. M. Willis; Buffalo, Dr. J. W. Beach; Fredonia, Dr. J. W. Beach; Oswego, Dr. J. H. Burkhart.

Nearly 4500 of the young men and ladies who will soon have the direction of our public schools were benefited by these lectures. The reports from several of the schools indicate that the lectures were inspirational and greatly appreciated; also that the lecturers were received with due consideration.

The matter of including instruction in the nurses' curriculum was taken up with Dr. Downing of the state department of Education. He was impressed with the necessity, and in a letter on the subject says—"The whole syllabus for nurse-training is in course of revision, and it will be some time before the revised course will be in my hands. As soon as it is ready for distribution I shall be glad to let you have a copy." It is now evident that sooner or later the nurses will have the much-needed instruction in the care of the mouth.

The state department of Health sends the following report:

Dr. L. A. TIMERMAN, *Chairman Oral Hygiene Committee:*

Dear Sir,—I beg to acknowledge your letter of March 26th, and to inclose herewith a brief statement regarding our work on Oral Hygiene. Owing to lack of funds we have not been able to make the new motion-picture film as we planned, but I hope to do this some time this summer. With very best regards, I am

Yours very truly,

TOM BOYNTON PECK,
Supervisor of Exhibits.

With the conclusion of the Health exhibit season on June 1st, Oral Hygiene work will have been carried on by the state department of Health in seventeen municipalities in New

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York State, as follows: Canton, Morrisville, Ithaca, Alfred, Fredonia, Hanover Station, Smith's Mills, Forestville, Stockton, Sheridan, Dunkirk, Silver Creek, Sherman, Mayville, Poughkeepsie, Lockport, Niagara Falls.

As in past years this has been done through lectures by the department's registered nurses, practically all of the school children in each municipality and from 50 to 500 adults being reached.

Aside from the regular exhibit work, one department lecturer is constantly at work in the parochial schools of the state. I regret that I have not at hand a statement of the number of schools she visited during the past year. Reference to past reports, however, shows that she averages one municipality a week, in each city reaching from one to five schools.

FIRST DISTRICT.

(Waldo H. Mork. W. T. VanWinkle.)

All together, our men in New York have given 35 lectures on Oral Hygiene. The toothbrush drill and the special care of the teeth have been uppermost in our minds during all our work. Beginning the week May 14th, we have our Oral Hygiene campaign in the schools, and the work we are planning will consist of publicity in the newspapers, lectures in the schools, composition on the teeth, toothbrush drills, and examination of the children's teeth.

SECOND DISTRICT.

(A. H. Stevenson. H. C. Croscup.)

(No report.)

THIRD DISTRICT.

(H. G. Kittell. M. E. Brown.)

Some clinical work was done in the schools of Lansingburg.

FOURTH DISTRICT.

(A. S. Moore (*res.*). S. A. Demarest.)
(L. A. Timerman, *Chairman.*)

A set of 26 slides was purchased, to be used by those giving lectures in the public schools. Lectures have been given or dates arranged for lectures at the following places: Malone, Canajoharie, Fort Plain, Cambridge, Salem, Granville, Greenwich, Piercefield, Faust, Conifer.

Dr. Facteau of Tupper Lake has given a number of lectures in the reception room of his office. The motion-picture film "Oral Health" was shown twice at Ogdensburg under the direction of Dr. Butler. The Amsterdam Medical Society was given a paper on Mouth Hygiene by Dr. Mabie.

FIFTH DISTRICT.

(G. B. Parker. E. A. Smith.)

Twenty talks were given in the public schools of Watertown, about 4690 children being in attendance. A dental clinic has been installed in the school at Solvay, N. Y., a competent operator being in attendance.

SIXTH DISTRICT.

(F. M. Willis. H. D. Whitmarsh, *Treas.*)

Some clinical work has been done at Binghamton.

SEVENTH DISTRICT.

(A. W. Smith, *Sec'y.* W. W. Belcher.)

Oral Hygiene in the Seventh District has taken great strides during the past year, but the activity has been limited to the city of Rochester. This is due to the inauguration of the new Eastman Dispensary and the School for Dental Hygienists.

Under the direction of the director, Dr. Burkhart, the organization of its working force along the line of a general survey of all the school children of the city has been progressing.

Drs. Marquedant, Donohue, and Doron, assisted by graduates and students of the Dental Hygiene School, examined the mouths of 2662 school children. At the same time, and as part of their instruction, the hygienists have been doing the prophylactic work in several schools. To date three schools have been covered and 1758 mouths have been cleaned.

Miss Gilman, Dr. Burkhart's secretary, has been giving illustrated talks in the public and parochial schools. More than 24,000 children have been reached.

It is anticipated that with the combined efforts of the general infirmary, the Orthodontia and Surgical departments of the Rochester Dental Dispensary, and the students and graduates of the School for Dental Hygienists working in the public and parochial schools, the next generation in Rochester will

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show a marked dental and consequently general improvement.

The two dispensaries of the Rochester Dental Society have been operating to their full capacity during the past year. With the opening of the new Eastman Dispensary these will go out of existence. One of these dispensaries has been in continuous operation for over thirteen years, and the other seven years. The third, which was destroyed when school No. 14 burned, saw eight years of service. The wonderful new dental infirmary, the gift of Mr. Eastman, is a fitting monument to the long and efficient service of the dispensaries which it replaces.

EIGHTH DISTRICT.

(J. W. Beach. D. H. Young (*res.*). I. E. Maul.)

Lectures on Oral Hygiene have been given to the employees of several manufacturing plants, but the public-school authorities have not encouraged our efforts this year. The motion-picture reel has been used several times at private and public gatherings within the city of Buffalo.

NINTH DISTRICT.

(W. V. Randall. Bertram Ball.)

The school board of North Tarrytown has been fortunate in interesting Mr. J. D. Rockefeller, Jr., in the need of taking care of children's teeth, and he has given the money to establish a school dental clinic in that district.

The school children of Dobbs Ferry, Irvington, Ossining, Mount Vernon, and New Rochelle are particularly well taken care of by the ethical dentists of these respective villages and cities.

The superintendent of schools of Yonkers is to recommend to the school board that a dental clinic be established in school No. 20.

A new dental clinic has been started, in a way, at St. Joseph's Hospital at Yonkers. The best equipped dental clinic in Yonkers is used but eight hours a week. This work is done voluntarily.

Oral Hygiene lectures have been given at Yonkers, Mount Vernon, Dobbs Ferry, Ossining, Poughkeepsie, Millbrook, and New Rochelle. Reports from various orphan homes in this district bring to our society the fact that the children of these homes are having better attention given to their mouth conditions than the children of the public schools.

A letter from Dr. Wm. A. Howe, state medical inspector of schools, reads as follows:

"As you of course know, many dentists throughout the state have generously designated special hours for free service to deserving children. By this means I feel confident much attention has been given to mouth conditions which otherwise would have been impossible. The school authorities in every locality where this system is being utilized are enthusiastic and appreciative of its practical use. I trust when the occasion arises you will also express my personal appreciation to the dental profession for its liberal assistance and co-operation in our endeavor to not only teach mouth hygiene, but preventive and corrective dentistry.

RECAPITULATION.

The following summary briefly outlines the efforts of the Oral Hygiene Committee during the past year:

Lectures given	568
" arranged for	10
Free clinics established	6
Motion picture exhibitions	6

The above is approximate. Many lectures on mouth hygiene have been given, but not reported in the usual way.

REPORT OF THE MOTION-PICTURE COMMITTEE.

The motion picture work of the committee has been progressing somewhat slowly since the last meeting. Two films were sold during the year, one to the Canadian Oral Prophylactic Association and the other to the North Carolina Board of Health. It has been sent out for rental purposes to several places—St. Lawrence State Hospital, Ogdensburg, N. Y.; Millbrook, N. Y.; Auburn, N. Y., and White Plains, N. Y.

We have received from the sale of films $290 and from rentals $15.00.

Disbursements were $70.18 for a new film and $3.31 for expenses of the secretary.

The committee has on hand one positive film suitable for rental purposes, and two partly worn-out copies.

ARTHUR W. SMITH, *Sec'y.*

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FINANCIAL.

Receipts.

1916	
May 12, balance on hand	$206.88
May 13, Dr. Cobb, film	50.00
Sept. 1, Dr. H. W. Smith, film	110.00
Oct. 10, Can. Oral Path. Assoc'n, film	130.00
Dec. 7, rental	5.00
1917	
Mar. 6, "	5.00
April 14, "	5.00
	$511.88

Disbursements.

1916		
May 13, to State Soc.	$200.00	
" 13, exp. (treas.)	2.02	
" 13, " (sec.)	17.34	
" 13, stationery	13.50	
Sept. 7, film	70.18	
1917		
May 10, L. A. Timerman, telegr., teleph., etc.	4.90	
		$307.94
		$203.94

Respectfully submitted,

LINCOLN A. TIMERMAN.

Report of the Fellowship Committee.

ROCHESTER, N. Y., May 10, 1917.

TO THE COUNCIL:

Gentlemen,—The Fellowship Committee beg to report the selection by unanimous vote of Dr. J. R. Callahan as the Fellow of the Dental Society of the State of New York for the year 1917.

Respectfully submitted,

A. W. WRIGHT,
A. R. COOKE,
EDWARD G. LINK,
LOUIS MEISBURGER, *Chairman*.

Report of the Finance (Auditing) Committee.

ROCHESTER, N. Y., May 11, 1917.

TO THE COUNCIL:

Gentlemen,—The Auditing Committee respectfully presents for your consideration the attached report:

The accounts of the treasurer, Dr. Geo. H. Butler, were examined and found correct.

The report of Dr. Wm. Carr for the Law Committee was found correct, and corresponded with the treasurer's report.

The chairman of the Clinic, Arrangement, and Exhibit Committees were unable at this time to present their accounts, and were given extended time.

Other bills of the 1917 sessions were audited.

C. A. BRADSHAW, *Chairman*,
H. D. WHITMARSH,
B. W. WHIPPLE,
Committee.

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Report of the Legislative Committee.

ROCHESTER, N. Y., May 7, 1917.

TO THE COUNCIL:

Gentlemen,—The Legislative Committee respectfully presents for your consideration the attached report.

Record of bills introduced in the Legislature during the session of 1917:

No. 138. January 22d. by Mr. Stivers, amending subdivision 1, section 198, public health law, by making it mandatory for the regents to issue a license to practice dentistry, without examination, to any applicant furnishing satisfactory proof that he has graduated from a registered dental school and thereafter lawfully engaged in such practice for six years, or who holds a license to practice in another state granted not less than six years before such application by the board of dental examiners of such state The recommendation of the board of dental examiners of this state is not necessary. (Same as A. 255.)

To Public Health Committee. Printed No. S. 140.

This bill was referred to committee on Public Health, and never came out.

No. 607. February 22d, by Mr. Boylan, providing that a person eligible to file on or before July 31, 1895, proof that he was a dental student under private preceptorship in the state, who failed to file the same but filed a certificate with the regents prior to January 1, 1904, and has since paid the examination fee, shall be admitted to practice dentistry without further examination, upon application to the regents. (Same as A. 906.)

To Public Health Committee. Printed No. S. 687.

This bill was referred to the Committee on Public Health, and was never reported out.

No. 1477. April 18th, by Mr. Wicks, amending section 198, public health law, by permitting the regents to license as a dentist, without examination, a person who has graduated from a registered dental school and thereafter conducted a general dental practice within the state for fifteen years prior to March 1, 1917, under certain conditions.

To Public Health Committee. Printed No. S. 1916.

This bill was referred to Public Health Committee, and never reported out.

No. 1493. March 27th, by Mr. Tallett, amending section 51, education law, by providing that the regents may by rule or order accept evidence of preliminary and professional education for licensing a candidate to practice medicine, dentistry, veterinary medicine, pharmacy, optometry, chiropody, shorthand reporter or architect, in lieu of that prescribed by law relating to such profession, if satisfied that the candidate has substantially met requirements of such laws, and may indorse a license issued in another state if satisfied that the requirements for such license were substantially equivalent to the requirements in this state at the time, and that applicant has been in lawful practice not less than five years prior to application for such indorsement.

To Public Education Committee. April 4th, reported to second reading. April 5th, to third reading. April 11th, passed. April 12th, in Senate, Rec. No. 410. To Public Education Committee. April 19th, reported to third reading. April 20th, passed. April 23d, to Governor. May 4th, approved. Chapter 357. Printed No. A. 1843.

This bill passed and was signed by the Governor on May 4th.

No. 1739. April 19th, by Mr. Seelye, amending subdivision d, section 203, public health law, by providing that a person violating the article against the unlawful practice of dentistry shall be subject to a penalty of $100 for each violation. Each day's violation constitutes a separate offense. The bill regulates the recovery of such penalties.

To Public Health Committee. May 1st, reported to third reading. Passed. May 2d, in Senate, Rec. No. 697. To third reading and public health committee. May 3d, reported. Restored to third reading. Printed No. A. 2330.

This bill was reported to the Committee on Public Health, and never reported out.

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No. 906. February 22d, by Mr. Straub, providing that a person eligible to file on or before July 31, 1895, proof that he was a dental student under private preceptorship in the state, who failed to file the same, but filed a certificate with the regents prior to January 1, 1904, and has since paid the examination fee, shall be admitted to practice dentistry without further examination, upon application to the regents. (Same as S. 607.)

To Public Health Committee. Printed No. A. 1011.

This bill is the same as Senate Bill No. 607 introduced in the Senate by Mr. Boylan. This bill was referred to Public Health Committee, but never reported out.

This committee would recommend that means be provided, so that information could be had upon all bills introduced.

GEORGE VANDERPOOL, *Chairman.*

Report of Committee on State Society Transactions.

ROCHESTER, N. Y., May 7, 1917.

TO THE COUNCIL:

Gentlemen,—The State Society Transactions Committee respectfully presents for your consideration the attached report:

Your committee on State Society Transactions beg leave to report that through the generosity of Dr. Chas. S. Butler, for many years actively associated with this society in various official capacities, we are able to present to the society a complete set of its own Transactions.

We would also respectfully recommend that this Executive Council appoint a committee of one from the Third District Dental Society, whose duty it shall be to have charge of the binding in suitable form all subsequent numbers of the Transactions, in order that the records of this society be deposited in complete form in the State Library.

The Transactions have been bound in suitable form, and are ready to ship to the committee appointed.

Respectfully submitted,

BENEDICT S. HERT,
R. MURRAY,
Committee.

Report of Committee on Registration.

ROCHESTER, N. Y., May 11, 1917.

TO THE COUNCIL:

Gentlemen,—The Registration Committee respectfully presents for your consideration the attached report:

The registration has this year been under the direct supervision of Dr. Wirt H. Conklin, the Rochester member of your committee. He has registered 500 members, and 294 guests.

G. H. BUTLER, *Chairman.*

Report of Committee on Ethics.

ROCHESTER, N. Y., May 7, 1917.

TO THE COUNCIL:

Gentlemen,—The Ethics Committee respectfully presents for your consideration the following report:

There has been no occasion for action of this committee during the last year.

J. N. GARLINGHOUSE, *Chairman,*
H. C. BENNETT,
TRACY STURDEVENT, *Committee.*

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Report of the Committee on Necrology.

ROCHESTER, N. Y., May 7, 1917.

TO THE COUNCIL:

Gentlemen,—The Necrology Committee respectfully presents for your consideration the following report:

In these heroic days the rolls of death are frequently the rolls of honor, and always it is part of our common faith and practice to cherish the names and memories of our beloved dead.

We pause amid the rush of the business of life to pay homage and give solemn thought to those who have served their day and generation, and passed to their appropriate reward. We like to think of them every one as having proved themselves "good and faithful" servants, as having faithfully run their race, and truly kept the faith, and thus finely finished their course, and accordingly, as having already received the crown of righteousness which fadeth not away.

Some of the names on this roll of achievement are the names of personal friends, and friendship mourns their departure; all are honored names of worthy members of our society, and exemplary exponents of our noble profession.

With due reverence and merited regard we record these names and dates. Not only would we memorialize them in the minutes of the State Society, but we would garland them upon the tablets of our hearts.

Nine deaths are reported to your committee as having occurred in our state membership during the past year. Five districts report no such losses; one district makes no report. The three districts which suffered losses by death's toll suffered three losses each.

The roll reads as follows:

First district—Julius Rivinius, H. Griffen Marshall, Sherman B. Price.

Second district—W. G. Clark, Brooklyn; W. W. Thompson, Brooklyn.

Seventh district—J. E. Sanford, Rochester.

Dr. Smith (brother of Dr. W. W. Smith), who at one time was president of this district society, and who died recently in California.

Dr. Rudolph Hofheinz of Rochester, who died on November 23, 1916.

At the annual meeting of the State Society in Rochester, the following resolution was adopted:

Whereas, Dr. Hofheinz was a good citizen and polished gentleman, and in his death the profession has suffered a distinct loss. He contributed generously to dental literature and had a national reputation as a teacher, writer and operator. He served the society as president for two years, and was always ready to take an active part in its papers and discussions. Be it therefore

RESOLVED, That in the death of Dr. R. H. Hofheinz, the society publicly expresses its deep appreciation of the loss of a tried and true member, active in its counsels, giving generously of his time and talents to it.

May all these brethren be fraternally remembered, and their choice virtues and humanitarian efforts emulated.

Respectfully submitted,

C. C. BACHMAN,
W. D. TRACY,
W. G. LEWIS, *Committee*.

Report of Committee on Arrangements.

TO THE COUNCIL:

Gentlemen,—The Committee on Arrangements would respectfully submit the following report:

Arrangements were made for holding the literary part of the program in the auditorium of Convention Hall, and the exhibits in the annex. The use of these two buildings is without cost from the city of Rochester.

A stereopticon and moving-picture machine with operator has been secured for Dr. Price's lecture Thursday night, the expense of which will be $22.00.

Respectfully submitted,

JOHN J. SCOTT, *Chairman*.

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Report of the Budget Committee.

ROCHESTER, N. Y., May 7, 1917.

TO THE COUNCIL:

Gentlemen,—The Budget Committee respectfully presents for your consideration the attached report:

In accordance with a resolution passed last year by the Executive Council, the Budget Committee, which was appointed at that time, submit the following, after having consulted the reports of our State Society for the past several years, and written to a number of other state societies for information.

We recommend the following:

(1) That the total appropriations granted shall be kept well within the estimated receipts.

(2) That a saving be made every year, in order to establish a strong balance in the treasury.

(3) That the officers and committees do not exceed the appropriations, although some slight leeway may be necessary, pending experience under the budget system.

(4) That the treasurer establish a uniform system of accounting, to be maintained year after year, thus permitting comparisons.

(5) That the secretary mail at once, to each officer and chairman of a committee, a statement of his appropriation.

(6) That all receipts be turned into the treasury, and be paid out on voucher only.

FINANCIAL FORECAST.

Estimated receipts.

(For year ending May 1, 1918.)

Interest on bank balance	$60.00
Annual dues, 1632 members at $4	6528.00
Total receipts	$6588.00

Estimated expenditures.

National Dental Association	$3264.00
Scientific research	500.00
Eastman testimonial	500.00
Essayists	300.00
Secretary, honorarium $200.00, exp. $75.00	275.00
Treasurer, exp.	5.00
Programs	150.00
Stationery	100.00
Trans. of State Society	100.00
Clinic Committee	75.00
Stenography and typewr., Exec. Council	40.00
Arrangements Committee	20.00
Correspondent	15.00
Legislative Committee	10.00
Bond for treasurer	5.00
Incidentals	100.00
Total	$4959.00

BENEDICT S. HERT, *Chairman,*
HERBERT L. WHEELER,
Committee.

Report of General Business Committee.

TO THE COUNCIL:

Gentlemen,—The General Business Committee respectfully presents for your consideration the following report:

Receipts.

Ritter Dental Mfg. Co.	$380.00
S. S. White Dental Mfg. Co.	190.00
The Dental Products Co.	100.00
Johnson & Lund	50.00
Primrose-Johnson Dental Supply Co.	50.00
I. Stern Dental Supply Co.	62.50
H. A. Swift	$35.00
American X-Ray Equipment Co.	75.00
Davis-Schultz Co.	50.00
A. P. DeSanno Co.	50.00
J. W. Ivory	35.00
Dr. Geo. W. Lacea	50.00
Denver Chemical Co.	40.00
Lavoris Chemical Co.	40.00
Chas. H. Phillips Co.	80.00
Borine Mfg. Co.	35.00
Colgate & Co.	45.00
Buffalo Dental Mfg. Co.	35.00

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Mynol Chemical Co.	$40.00	Weissfeld Bros.	$42.50
Cleveland Dental Mfg. Co.	50.00	Stratford-Cookson Co.	40.00
Detroit Dental Mfg. Co.	40.00	Williams Gold Refining Co.	35.00
Bristol-Myers Co.	87.50	Prest-O-Lite Co., Inc.	42.50
Horlick's Malted Milk Co.	50.00	Weber Dental Mfg. Co.	82.50
Garhart Dental Specialty Co.	40.00	King's Specialty Co.	42.50
Kolynos Company	45.00	Oakland Chemical Co.	37.50
The Dentists' Supply Co.	90.00	Yawman & Erbe Mfg. Co.	42.50
Kress & Owen Co.	37.50	Waite & Bartlett Mfg. Co.	50.00
DeVilbiss Mfg. Co.	47.50	20th Century Dental Broach Co.	37.50
Wilmot Castle Co.	47.50	A. S. Clark & Co.	50.00
The Dental Mfg. Co.	65.00	Consolidated Dental Mfg. Co.	45.00
The Santiseptic Co.	35.00	W. M. Sharp Mfg. Co.	50.00
W. V-B. Ames Co.	40.00	Cutler Specialty Co.	47.50
The Albodon Co.	40.00	Eastman Kodak Co.	50.00
American Cabinet Co.	105.00	Paine Drug Co.	52.00
Columbus Dental Mfg. Co.	47.50	Dental Supply Co.	37.50
A. S. Koch & Sons	37.50	The Dental Specialty Co.	50.00
David B. Levy, Inc.	37.50	X-Ray Tube Co.	43.00
L. D. Caulk & Co.	50.00	Pyro Sterilizer Co.	43.00
Electro Dental Co.	50.00	Makers of Flossy	37.50
Pelton Crane Co.	42.50	Campbell Electric Co.	45.00
H. D. Justi & Son Co.	52.50	Dental Electric Co.	47.50
Heusner & Piehler	42.50	Indexo Company	23.75
Lee S. Smith & Son Mfg. Co.	42.50		
A. S. Garlock	27.50	Total	$3766.75

Disbursements.

Convention Hall expenses:

Servas Scenic Studio, Inc., booths and decorations	$870.00
Edwin C. Kaelber, floral decorations	80.00
A. M. Ballarian, rugs	15.00
Howe & Rogers Co., draping	20.75
Sibley, Lindsay & Curr Co., draperies	49.96
John R. Taylor, carpenter work	20.00
Joseph A. Schantz Co., furniture	60.00
Laube Electr. Const. Co., wiring	206.79
Rochester Ry. & Light Co., gas and piping	23.38
C. R. Wetterman, signs	6.30
C. R. Theurkauff, signs	58.35
Harry Martell, porter services	20.00
A. S. Crane, receiving clerk	40.42
Millard T. Morris, labor, etc.	107.50
Percy B. Dutton, fire insurance	26.25

Clinic expenses:

Dr. W. W. Smith, ch., personal disburs'ts	55.65
John R. Taylor, carpenter work	81.95
Fred F. Sabey Co., canvas partitions, etc.	120.00
Chas. E. Mason, motion-picture equipment	26.00
" " " " " "	13.00
Dr. H. J. Burkhart, essayists' expenses	295.00

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Administration and publicity:

Gillette Stenographic Co., typewr. and postage	$58.50
Josephine M. Zugelder, stenography	9.25
Theo. Allen, publicity, corr., etc.	170.00
L. C. Smith & Bros. Typwr. Co., typewriter rental for sec'y	1.00
Postal Telegraph Co., telegrams	6.85
Western Union Telegraph Co., telegrams	1.47
H. O. Bodine, publicity and designing	50.00
Allan Porter, newspaper publicity	35.00

Printing, multigraphing, and postage:

Alfred Herle Press, printing, etc.	455.60
Auburn Publ. Co., stationery, etc.	116.00
" " " " "	7.50
H. J. Siebert, circular letters and postage	239.50
Bastian Bros., badges and ribbons	121.50
Gordon, Madden & Kaelber, floor plans	21.43
Post-Express Ptg. Co., cuts	4.50

Hotel expenses:

Powers Hotel, rooms for essayists	37.84
Hotel Rochester, rooms for essayists	3.00

Miscellaneous expenses:

Edward G. Link, personal exp.	116.99
Ritter Dental Mfg. Co., cuts, postage, etc.	6.17
Theodore Wagner, clerical services	8.00
Total disbursements	$3666.40

RECAPITULATION.

Receipts	$3766.75
Disbursements	3666.40
Net proceeds	$100.35

E. G. LINK, *Chairman.*

Report of Delegates to N. D. A.

ROCHESTER, N. Y., May 9, 1917.

TO THE COUNCIL:

Gentlemen.—The delegates to the National Convention respectfully present for your consideration the following report:

As the proceedings of the House of Delegates of the National Dental Association to which the delegates are accredited have been published in the *Journal* of the Association, and all members have the same, it would be superfluous to make specific report concerning their duties at the meeting in Louisville, Ky.

DELEGATES.

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Report of Clinic Committee.

ROCHESTER, N. Y., May 7, 1917.

TO THE COUNCIL:

Gentlemen,—The Clinic Committee respectfully presents for your consideration the following report:

PROGRESSIVE ILLUSTRATED LECTURES.

Leuman M. Waugh, New York City. "The Technique of Making Dental Radiographs."

(A full description of this clinic will be found at page 157.)

Rodriguez Ottolengui, New York City. "Interpretation of Dental Radiographs."

Russell W. Bunting, Ann Arbor, Mich. "The Effect of Mouth Infections upon the General Health."

(A full description of this clinic will be found at page 159.)

Marvin Welcher, Miss Eleanor Martin, and Miss Nydean Miller, dental hygienists, Rochester. "The Field of the Dental Hygienist."

Louis Meisburger, Buffalo. "Practical Sterilization for the Dentist."

(A full description of this clinic will be found at page 163.)

Harold S. Vaughan, New York City. "Oral Anesthesia."

(A full description of this clinic will be found at page 165.)

GENERAL CLINICS AND DEMONSTRATIONS.

(1) An Authorized Demonstration of Dr. Edward H. Angle's New Ribbon Arch Bracket Appliance, with Technique of Adjustment. By Robert H. Strang, Bridgeport, Conn., and Frank A. Gough, Brooklyn, N. Y.

(2) A System for Outlining the Arch for Orthodontic Procedures. By Percy Norman Williams, New York City.

This clinic consists of a simple system which can be readily understood and used by the general practitioner for predetermining the shape of the arch for orthodontic procedure. It is based upon two thousand measurements of skulls, living subjects, and models, and briefly is as follows:

Nature maintains a uniform ratio between the distance across the posterior part of the arch, and across from cuspid to cuspid; this ratio is fourteen to nine. The center of development for the arch is midway between the sixth-year molars. A circle is constructed for the six front teeth, using this point as a center. This circle is connected with the base line running between the molars, and indicates the bicuspid region. This completes the predetermined arch. The size of this predetermined curve is based upon the mesiodistal diameters of the teeth, from the buccal groove of one sixth-year molar to the buccal groove of the other.

(3) Orthodontia. By Frederick J. Shaddock, Rochester, N. Y.

This clinic was on incline planes for the purpose of jumping the bite and elongating posterior teeth in infra-occlusion.

(4) Orthodontia, Special Cases. By Harry E. Fitch, Elmira.

(5) Conductive Anesthesia. By Courtland S. Jones, Buffalo.

(6) Nitrous Oxid Analgesia. By Lawrence L. Mulcahy, Batavia.

(7) The Management of Pyorrhea. By Ivan R. Cottrell, Rochester.

This clinic consisted of showing in the first place the necessity for clearly and definitely fixing in mind the fundamental ideas that one should have concerning the objects to be attained in the treatment of pyorrhea alveolaris.

In the treatment, three fundamental factors were described and demonstrated as being absolutely necessary to act upon in order to produce successful results. These three main factors were:

1. To find and remove the cause.
2. The surgical technique.
3. The maintenance of a sanitary condition.

These factors were dwelt upon and described in detail. A completed case was exhibited.

(8) Post-Pyorrhea Care of the Mouth Following Pyorrhea Treatment. By Michael C. Bradley, Rochester.

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(9) The Results of Ionic Medication. By Pliny W. Smith, Rochester.

(10) Attachment for Reliable Synthetic Tips on Anterior Teeth, or for Single-Tooth Bridges. By Harry B. Butler, Ogdensburgh.

Dr. Butler showed a method of attaching a gold casting to the lingual surface of anterior teeth without injury to the pulp. This was retained by a method of dovetailing, and while covering the entire lingual surface it was not visible from a normal view of the tooth.

This attachment he used in placing small bridges, and a case was shown where the entire tip of an incisor was restored with synthetic cement by the use of the same attachment.

(11) Radiology: Interpretation and Keeping Records. By Arthur W. Smith, Rochester.

(12) Removable Bridge Work. By Marvin Welcher, Rochester.

(13) Partial Plates, with Special Reference to Clasps. By Herbert D. Whitmarsh, Binghamton.

This clinic illustrated the principle of the clasp, together with the form and fitting of the same and method of attachment to plates both metal and rubber; showed also position of lingual bar and palatal bar for partial plates.

(14) Gold Inlays. By Everett R. Neff, Carthage.

(15) Scientific Impression Taking, by the Modeling Compound Advanced Method, and the Making of Properly Constructed Models, Based on the Greene Brothers' Principle. By Robert H. Lieberthal, New York City.

(16) Getting the Matrix for a Porcelain Inlay Without Breaking the Model. By Frank A. Greene, Geneva.

The method consists in taking an impression of the cavity with modeling compound, trimming the *sides* of the impression to make it a trifle smaller than the cavity; then form the platinum foil over the impression, and with the impression carry into the cavity, pressing down. Remove the impression, leaving the matrix in place, and finish fitting to the cavity, with balls of wet cotton, etc.

(17) The Indirect Method of Casting Gold Inlays. By Walter E. Fancher, Yonkers.

A demonstration was made of the technique of the different steps in the process from the preparation of the cavity until the wax is ready for investment and casting; viz, special preparation of cavity necessary for easy removal of impression, the selecting and cutting of the impression tray, taking of impression and bite together with separate modeling compound impressions of both upper and lower approximating teeth for the purpose of reproducing the natural fine lines upon the case; the articulating of resultant models by means of squash bite, the investment of the impression in plaster so that a proper matrix for packing the amalgam is obtained; the subsequent packing of impression with amalgam, articulating of models and die, carving of wax inlay, and finally the finishing of the cast inlay.

(18) Black's Method of Cavity Preparation. By M. H. McOmber, Gouverneur.

(19) Demonstrating Ways and Means of Using the Cast-Base Porcelain Crown for Anterior and Bicuspid Teeth. A Way of Adapting Detached Porcelain Crowns to Whole or Broken-down Roots. By Clinton T. Vail, Yonkers.

WILLIAM W. SMITH, *Chairman.*

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REPORTS FROM THE DISTRICT SOCIETIES.

First District.

THE annual meeting of the First District Dental Society of the State of New York was held on April 2, 1917, and the following persons were elected officers for the ensuing year:

President—Chas. F. Ash.

Vice-president—Arthur H. Merritt.

Recording Secretary—Leland Barrett.

Corresponding Secretary—J. Russell Watson.

Treasurer—John L. Peters.

Editor—C. G. Fletcher.

Librarian (appointed, not elected)—B. W. Weinberger.

Supervisor of Sections—O. J. Chase, Jr.

Board of Dental Examiners—Wm. C. Deane.

Member of State Council—Arthur L. Swift (regular), James F. Hasbrouck (alternate).

Delegate to National Dental Association—Henry W. Gillett (regular), J. Ostram Taylor (alternate).

The following were appointed to serve on State Society Committees: Gladstone Goode (Legislative); B. B. Palmer, Jr. (Law); W. H. Mork, W. T. Van Winkle (Oral Hygiene).

The First District Society has had a busy and successful year, measured by the work accomplished, both in the regular programs and the postgraduate sections, and in the increased membership.

The essays were as follows: J. V. Conzett, "Technique of Making a Gold Inlay." Prof. W. J. Gies and collaborators, "Annual Report of Research Work." Dr. Bissell B. Palmer, Jr. (our own member), "The New Era in Dentistry: Its Relation to the Increase in Malpractice Suits." Dr. Ernest Sturridge, London, Eng., "Ionic Medication." Dr. J. Lowe Young, "Co-operation Between Dentist and Orthodontist." Dr. Arthur D. Black, "Studies of the Investing Tissues of the Teeth as a Guide for Treatment of Chronic Alveolar Abscess and Suppurative Pericementitis."

The Postgraduate Sections, under the direction of Dr. O. J. Chase, Jr., are continuing to increase in popularity and usefulness, every section having its membership filled early, and the attendance records being remarkably good.

We have received with regret news of the death of the following: H. Griffin Marshall, Sherman B. Price, and Julius Rivinius.

Following the custom of the past two seasons, we have continued, with great success, the afternoon clinics, and the informal dinners, preceding the monthly regular meetings.

Making all allowances for deaths, resignations, those dropped, and new members, our roll is as follows—active 493, associate 288, life 13, honorary 48, making a total of 842 at the annual meeting. Since elected, but not yet positively qualified—active 11, associate 1.

Respectfully submitted,

LELAND BARRETT, *Rec. Sec'y.*

ACTIVE MEMBERS.

Abel, L. Hosford, 8 W. 40th st.
Adams, Irving F., 243 W. 98th st.
Addelston, W. M., 73 E. 92d st.
Agostini, E. M., 141 W. 76th st.
Andrade, Alex., 123 W. 95th st.
Arkin, David M., 150 W. 87th st.
Armstrong, Herbert R., 200 W. 72d st.
Aronson, Geo. G., 507 Fifth ave.
Aronstein, William, 507 Fifth ave.
Asch, Andrew J., 331 Madison ave.
Asch, Jacob, 331 Madison ave.
Ash, Chas. F., 115 Broadway.

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Babcock, Ralph W., 140 W. 57th st.
Baker, David C., 516 Fifth ave.
Baker, Edward W., 119 W. 121st st.
Baldwin, Harold L., 104 E. 40th st.
Baldwin, L. C., 167 W. 71st st.
Ball, Louise C., 576 Fifth ave.
Ballin, Irving J., 164 E. 72d st.
Bark, Arthur W., 779 Madison ave.
Barker, Clinton Reed, 753 Fifth ave.
Barnard, Wm. E., 40 E. 41st st.
Barnett, Lawrence, 167 W. 71st st.
Barrett, Leland, 220 W. 98th st.
Bate, Jacob, 758 West End ave.
Baumann, Harry G., 103 Park ave.
Bechtold, August C., 451 West End ave.
Beekman, A. Russell, 24 E. 48th st.
Beiser, H. Everett, 250 W. 74th st.
Bendernagel, James F., 451 West End ave.
Benney, Walter, 17 E. 38th st.
Berger, Adolph, 158 E. 79th st.
Berlin, Simon, 1800 Seventh ave.
Betzig, Edward P., 417 E. 143d st.
Beyer, Fritz A., 168 E. 38th st.
Bickel, Otto, 701 Madison ave.
Bieber, Louis E., 151 W. 86th st.
Birkhahn, Alex. M., 302 Central Park West.
Birnberg, Frederick, 47 W. 39th st.
Bishop, Edward A., 386 Audubon ave.
Blakeslee, Geo. W., 157 W. 93d st.
Blattstain, Leon, 133 W. 72d st.
Bleyer, LeRoy Mount, 230 W. 79th st.
Bluhm, Maurice M., 965 Tiffany st., Bronx.
Bluhm, Jacob A., 868 Union ave.
Blum, Richard, 576 Fifth ave.
Blum, Theodor, 140 W. 57th st.
Bogue, Edward A., 63 W. 48th st.
Bogue, Fred L., 63 W. 48th st.
Bohm, L. W., 55 W. 95th st.
Bourne, A. R., 174 W. 79th st.
Bowman, Harry, 108 E. 73d st.
Brandt, Henry, 200 W. 113th st.
Brash, W. W., 1472 Broadway.
Brazier, R. Horace, 125 E. 24th st.
Brazill, Manuel J., 2090 Seventh ave.
Breen, John M., 115 E. 17th st.
Brice, James H., 144 E. 19th st.
Brinkman, Harry J., 52 Vanderbilt ave.
Brophy, Chas. J., 3456 Broadway.
Brophy, Frederick H., 3456 Broadway.
Browne, Chas. L., 200 W. 55th st.
Brown, Irving W., 260 W. 72d st.
Brown, M. Hart, 1511 E. Chester road.
Brush, F. C., 17 E. 38th st.
Bryer, Russell K., 515 Madison ave.
Buckley, John F., 272 Willis ave.
Burke, J. Willard, 8 W. 40th st.
Burgess, Jas. Kendall, 149 Broadway.
Burns, Bert A., 8 W. 40th st.
Burt, John D., 40 E. 41st st.
Burton, I. G., 1482 Broadway.
Butler, E. Santley, 576 Fifth ave.
Buxbaum, A. I. F., 341 Madison ave.
Byers, J. M., 303 Fifth ave.
Campbell, Guy, 253 Columbus ave.
Carleton, S. S., 171 W. 71st st.
Carman, Herman F., 343 E. 142d st.
Carney, Matthew F., 51 E. 42d st.
Carr, Wm., 375 Park ave.
Carrabine, Oscar, 542 Fifth ave.
Chase, O. J., Jr., 17 E. 38th st.
Chayes, Herman E. S., 576 Fifth ave.
Chicherio, F. A., 235 W. 129th st.
Clayton, Walter H., 423 W. 120th st.
Cloney, Thomas F., 28 W. 39th st.
Cloud, Agnes D., 449 W. 23d st.
Cohen, Bernhard, 315 Fifth ave.
Colburn, M. L., 600 W. 157th st.
Colburn, Walter H., 753 Fifth ave.
Cole, C. Monford, 616 Madison ave.
Cole, Frank C., 59 W. 46th st.
Cole, J. P., Dobbs Ferry, N. Y.
Collins, Martin L., 2001 Fifth ave.
Concklin, Edward F., 44 E. 64th st.
Converse, J. S., 42 W. 40th st.
Conzelman, Theo., 1042 St. Nicholas ave.
Cotton, Waite A., 240 W. 74th st.
Cowles, Ward H., 1993 Boston road.
Cravens, J. E., 24 E. 10th st.
Crilley, Ellsworth T., 1328 Broadway.
Crookshank, F. A., 849 E. 156th st.
Cudlipp, Edwin, 167 W. 71st st.
Currie, Alex. W., 40 E. 41st st.
Dailey, Washington, 667 Madison ave.
Dailey, Wilber M., 19 E. 69th st.
Davenport, F. N., 33 W. 42d st.
Davenport, R. M., 51 W. 47th st.
Davenport, Sebert E., 51 W. 47th st.
Davenport, Sebert E., Jr., 51 W. 47th st.
Deane, Harry T., 616 Madison ave.
Deane, Wm. C., 616 Madison ave.
Degenhardt, M., 230 W. 97th st.
Degenhardt, William F., 1125 Lexington ave.
Delano, Frank S., 576 Fifth ave.
Delaney, John T., 1378 Lexington ave.
Demetrius, Menelas, 47 W. 37th st.
Deschler, George L., 576 Fifth ave.
De Sola, S., 333 Central Park West.
De Wolfe, Edward R., 1730 Broadway.

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Dickinson, J. W., 542 Fifth ave.
Dills, Wm. B., 33 W. 42d st.
Dingman, Florence, 167 W. 71st st.
Dixon, Edwin H., 40 E. 41st st.
Doskow, Samuel, 452 Fifth ave.
Doxtater, L. W., 675 Madison ave.
Draper, Wm. H., 11 E. 48th st.
Dunning, Henry S., 17 E. 38th st.
Dunning, Wm. B., 140 W. 57th st.
Durschang, A. C., 321 E. 17th st.
Eakin, Stanley H., 18 E. 41st st.
Easton, B. A., 66 Market st., Poughkeepsie.
Eddy, G. M., 618 Fifth ave.
Elster, Robert E., 527 Fifth ave.
Emerson, C. H., 167 W. 71st st.
Epstein, Michael, 15 W. 44th st.
Erganian, J. K., 175 Fifth ave.
Evans, Harry P., 44 E. 64th st.
Evans, George, 55 W. 39th st.
Evans, George, Jr., 55 W. 39th st.
Fairchild, Beatrice C., 23 E. 126th st.
Ferris, Henry C., 104 E. 40th st.
Fischer, Edward W., 202 W. 74th st.
Fisher, Wm. C., 373 Fifth ave.
Fletcher, Cecil Gray, 527 Fifth ave.
Fletcher, C. R., 167 W. 71st st.
Force, Willard B., 576 Fifth ave.
Forstein, D. R., 575 W. 175th st.
Fossume, Finn S., 616 Madison ave.
Fox, Edward, 252 W. 79th st.
Franken, Sigmund W., 36 E. 40th st.
Freedman, Anna G., 275 Central Park West.
Freund, J. F., 115 Broadway, care Dr. Ash.
Fulton, John G., 116 W. 59th st.
Gallagher, Lawrence W., 501 W. 142d st.
Gardner, Walter H., 597 Fifth ave.
Gates, Albert W., 606 W. 116th st.
Getz, Forry R., 576 Fifth ave.
Getzoff, Samuel M., 33 W. 42d st.
Gibbs, John R., Jr., 149 Broadway.
Gibson, Kasson C., 115 W. 77th st.
Gies, Carl J., 315 E. 86th st.
Gilder, James K., Jr., 915 Seventh ave.
Gillett, Henry W., 140 W. 57th st.
Gluck, Ernest, 116 West 118th st.
Glucksman, Alfred A., 671 E. 158th st.
Goldberg, Harry A., 2 W. 86th st.
Goldin, Jacob E., 944 Lexington ave.
Goode, Gladstone, 576 Fifth ave.
Gottschaldt, Martin C., 40 E. 41st st.
Grace, Thomas M., 167 W. 71st st.
Green, Leo, 44 E. 75th st.
Greenbaum, Leo, 741 Fifth ave.
Griffin, Francis D., 164 W. 73d st.
Gudewill, R. H. E., 30 W. 59th st.
Gunn, Andrew H., 40 E. 41st st.
Gunton, Leonard M., 40 E. 41st st.
Guthrie, Percy H., 170 Broadway.
Haas, Arthur, 8 W. 40th st.
Haigh, Herbert, 329 Amsterdam ave.
Halgren, Charles C., 915 Seventh ave.
Hammer, H. F., 69 E. 55th st.
Hargett, Arthur V., 2016 Seventh ave.
Harlan, E. W., 35 W. 39th st.
Hart, Harriette, 142 W. 71st st.
Hart, M. P., 33 W. 42d st.
Hartman, Wm. N., 167 W. 71st st.
Harvitt, Joseph, 214 E. Broadway.
Hasbrouck, Jas. F., 40 E. 41st st.
Hasbrouck, J. Roswell, 171 W. 71st st.
Hassell, Samuel W., 118 W. 71st st.
Hassinger, J., 280 Madison ave.
Heckard, Wm. A., 50 E. 42d st.
Heinzer, Edward A., Amsterdam ave. and 99th st.
Heller, Chas. A., 165 E. 116th st.
Hellman, Milo, 40 E. 41st st.
Herbert, Wm. C., Kattonah, New York.
Herbst, Louis, 323 E. 4th st.
Herbst, Max, 4 New Chambers st.
Hermans, James, 167 W. 71st st.
Herzog, J. R., 54 E. 93d st.
Hess, Samuel, 818 Lexington ave.
Hill, D. A., 1295 Fulton ave.
Hills, Wm. B., 307 E. 18th st.
Hirschfeld, Isador, 17 W. 42d st.
Hlavac, Chas. W., 240 E. 69th st.
Hoag, Wm. J., 331 Madison ave.
Hobby, G. W., 167 W. 71st st.
Hoblitzell, C. M., 431 Convent ave.
Holbridge, P. A., 157 W. 79th st.
Hollinghead, W. J., 8 W. 40th st.
Houston, H. C., 69 Sixth ave.
Howe, Frank Morgan, 113 E. 60th st.
Howells, Edward W., 31 W. 47th st.
Hughes, Austin V., 133 E. 43d st.
Hull, Geo. A., 123 W. 73d st.
Husch, Sylvester B., 64 W. 12th st.
Hussa, Philip, 8 W. 40th st.
Hutchinson, R. G., Jr., 8 W. 40th st.
Igel, Victor, 420 Albemarle road, Brooklyn.
Ireland, Alice J., 44 W. 47th st.
Irving, Wm. W., 40 E. 41st st.
Jackson, Victor H., 40 E. 41st st.
Jackson, Walter M., 357 W. 116th st.
Jenkins, G. R., 40 E. 41st st.
Jernigan, Geo. F., 61 W. 56th st.
Jones, Lawrence H., 2 Wall st.

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Kaemmerer, Henry A., 1130 Fox st.
Kaplan, Emanuel M., 136 Liberty st.
Karmiohl, Jacob, 340 E. 72d st.
Kauffer, H. J., 112 W. 72d st.
Kauffman, Jos. H., 601 W. 177th st.
Keith, Ross H., 185 Madison ave.
Kelley, Frank J., 576 Fifth ave.
Kelly, O. R., 200 W. 72d st.
Kelsey, Ernest A., 2001 Fifth ave.
Kemple, Frederick C., 576 Fifth ave.
Kennard, Louis W., 542 Fifth ave.
Kennedy, Clement D., 119 E. 60th st.
Kennedy, Edward, 347 Fifth ave.
Kessler, Samuel J., 528 W. 111th st.
Kimball, C. Denney, 104 E. 40th st.
Knecht, Wm. D., 40 E. 41st st.
Knorr, Raymond S., 720 W. 180th st.
Kohn, Alfred L., 341 Madison ave.
Krows, Earl, 126 W. 126th st.
Kreisler, David, 133 W. 72d st.
Lambert, H., 122 E. 74th st.
Lang, Joseph, 116 W. 59th st.
La Roche, Montgomery, 704 Madison ave.
Lazarnick, Louis L., 575 West End ave.
Lederer, Wm. J., 150 E. 74th st.
Leggett, Geo. H., 133 W. 123d st.
Lekowski, Victor, 133 W. 72d st.
LeRoy, Louis C., 38 W. 50th st.
Lester, Wm. B., Park Row Building.
Levene, Benjamin L., 161 W. 86th st.
Levy, Joseph, 18 W. 115th st.
Levy, Joseph M., 28 W. 89th st.
Liebrecht, Chas. F., 203 W. 81st st.
Lief, Nathaniel, 320 Fifth ave.
Lief, J. O., 320 Fifth ave.
Lindsay, Elmer A., 36 E. 40th st.
Lindsay, Harley B., 40 E. 41st st.
Linton, Chas. C., 40 E. 41st st.
Litten, Arthur S., 140 W. 69th st.
Locherty, Jas. B., 229 W. 78th st.
Lowenstein, Julius, 971 Second ave.
Lowenstein, M. S., 2 W. 94th st.
Lyke, J. Hyatt, 219 W. 86th st.
McGrath, S. W., 321 E. 17th st.
McKenzie, James, Jr., 57 W. 84th st.
McLaren, Francis J., 500 Fifth ave.
McNaughton, Stuart H., 63 W. 49th st.
McNeille, Chas. S., 500 Fifth ave.
McNeille, Perry R., 500 Fifth ave.
MacDonald, C. Franklin, 140 W. 57th st.
Macdonald, Wm. D., 576 Fifth ave.
Madsen, M. P., 201 W. 94th st.
Maller, J. William, 303 E. 161st st.
Malevanchik, Max, 38 Park Row.
Manney, G. A., 51 E. 42d st.
Manville, Geo. P., 576 Fifth ave.
Marco, B. Barrymore, Hotel Ansonia.
Marks, Cecil H., 2050 Amsterdam ave.
Mattes, Otto, 241 W. 14th st.
Matteson, George E., 150 W. 104th st.
Meeker, John B., 323 W. 89th st.
Mehlig, Carl F. C., 527 Fifth ave.
Merritt, Arthur H., 59 W. 46th st.
Mestel, Morris, 24 Avenue A.
Metzger, Otto I., 135 Central Park West.
Meyer, John H., 167 W. 71st st.
Millard, Joseph J., 40 E. 41st st.
Miller, Alonzo B., 542 Fifth ave.
Miller, Arthur, 2880 Broadway.
Miller, Raymond S., Aeolian Hall.
Minner, Edmund E., 144 W. 92d st.
Mishnun, Harry, 601 W. 137th st.
Mitchell, Vethake E., 17 E. 38th st.
Mobley, Lewis K., 46 W. 51st st.
Monroe, Thomas H., 437 Fifth ave.
Moolten, Raphael J., 35 W. 42d st.
Mork, Waldo H., 1882 Grand Concourse, Bronx.
Moss, Michael L., 1239 Madison ave.
Nagel, Harold, 228 Audubon ave.
Nash, Benj. C., 140 W. 57th st.
Nash, Louis, 15 Columbus Circle.
Neuwirth, Louis, 133 W. 72d st.
Newcomb, Samuel G., 560 Fifth ave.
Newgarden, Charles, 562 W. 162d st.
Nickerson, Ernest W., 101 W. 72d st.
Niles, F. B., 2139 Seventh ave.
Noll, Joseph A., 501 W. 138th st.
Northrop, H. W., 546 Fifth ave.
Nyce, Justin Ellis, 32 W. 42d st.
O'Brian, L. A., 542 Fifth ave.
O'Byrne, Edward J., 233 W. 83d st.
Oeder, Andrew H., 631 E. 168th st.
Ogden, Harry B., 130 W. 57th st.
Onderdonk, Thos., 542 Fifth ave.
Ottolengui, R., 80 W. 40th st.
Palmer, Bissell B., 220 W. 98th st.
Palmer, Bissell B., Jr., 40 E. 41st st.
Palmer, Corydon, 133 W. 72d st.
Palmer, Delos, 49 W. 50th st.
Palmer, Geo. B., 40 E. 41st st.
Parker, Horace J., 104 E. 40th st.
Paulsen, M. A., 2041 Fifth ave.
Pease, J. Grant, 61 W. 74th st.
Penny, Clarence J., 233 W. 83d st.
Perez, José G., 315 Fifth ave.
Perkins, Bertram R., 40 E. 41st st.
Peters, August L., 125 E. 64th st.

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Peters, Henry H., 260 W. 72d st.
Peters, John L., 133 W. 72d st.
Phillips, Henry H., 1722 Aeolian Hall.
Polhamus, Agnes I., 98 Morningside ave.
Pollinger, Nathaniel L., 200 W. 109th st.
Potter, Howard M., 413 W. 146th st.
Pratt, Frederick W., 46 W. 51st st.
Prensky, William S., 507 Fifth ave.
Prentiss, Elias B., 130 W. 57th st.
Quendenfeldt, Paul B. H., 570 Bergen ave.
Rabell, Chas. Francis, 40 E. 41st st.
Randolph, W. F., 1328 Broadway.
Ranhofer, Edward J., 65 W. 70th st.
Rathfelder, G. C., 300 W. 107th st.
Raymond, E. H., Jr., 542 Fifth ave.
Ream, Frederick K., 1514 Aeolian Hall.
Reed, J. Howard, 33 W. 42d st.
Reed, James Howard, Aeolian Hall.
Refsum, Joseph, 832 Lexington ave.
Reitz, Ralph B., 576 Fifth ave.
Requa, J. Eugene, 616 Madison ave.
Rettich, Hugo, 52 W. 68th st.
Rhein, M. L., 38 E. 61st st.
Riblet, E. Briggs, 351 W. 145th st.
Rice, Geo. E., 24 E. 48th st.
Richardson, C. C., 292 W. 92d st.
Riggs, Wm. D., 24 E. 48th st.
Robinson, Edwin S., 28 W. 39th st.
Root, John C., 24 E. 48th st.
Ros, Osvaldo, 452 Fifth ave.
Rosalsky, Harry W., 230 W. 97th st.
Rosenbaum, Wm., 219 W. 86th st.
Rothkranz, W. C., 30 E. 42d st.
Rouse, Arthur G., 576 Fifth ave.
Rouse, A. G., Jr., 576 Fifth ave.
Roy, Frank Austin, 527 Fifth ave.
Roy, Harold E., 527 Fifth ave.
Rubricius, Frank I., 212 E. 72d st.
Rubsam, C. William, 140 W. 57th st.
Ruyl, J. P., 40 E. 41st st.
Ryan, E. P. R., 452 Fifth ave.
Ryan, T. J., 200 Fifth ave.
Salsbury, Henry L., 120 W. 86th st.
Salvatore, Victor P., 582 Second st., Brooklyn.
San, Henry, 17 E. 38th st.
Sanford, Edward A., 33 W. 42d st.
Schamberg, Morris I., 116 W. 59th st.
Schattman, Sidney, 565 W. 162d st.
Schiff, Wm. G., 231 W. 125th st.
Schnaper, Samuel, 860 Lexington ave.
Schneer, Jacob B., 308 E. 15th st.
Schwamm, Henry, 174 E. 74th st.
Schwartz, Frederick J., 261 W. 21st st.
Scobey, Harry C., 116 W. 59th st.
Scott, Charles F., 17 E. 38th st.
Scudder, Chas., 17 E. 38th st.
Senior, Eugene, 333 Central Park West.
Shaw, Geo. M., 40 E. 41st st.
Sheckter, Samuel J., 1849 Madison ave.
Sherry, Ernest, 301 W. 109th st.
Shields, Nelson T., 61 W. 56th st.
Short, Wm. B., 52 Vanderbilt ave.
Simon, Samuel, 794 Lexington ave.
Simpkinson, Chas. W., 576 Fifth ave.
Sinnigen, Walter C., 560 Fifth ave.
Skalmer, M., 124 E. 95th st.
Skidmore, J. L., 8 W. 40th st.
Smith, Edward C., 17 E. 38th st.
Smith, Fred E., 576 Fifth ave.
Smith, F. Milton, 40 E. 41st st.
Smith, Karl C., 576 Fifth ave.
Snider, Edward E., 1 W. 127th st.
Solow, L. J., 33 W. 42d st.
Spencer, H. W., 437 Fifth ave.
Spengeman, Percy G., 400 W. 152d st.
Spring, Wm. A., 8 W. 40th st.
Stack, Wm. H., 488 Tremont ave.
Stahl, Harvey E., Aeolian Hall.
Stanton, Fred'k L., 28 W. 39th st.
Stark, A. Burton, 505 Fifth ave.
Starr, Alfred Russell, 8 W. 40th st.
Steeves, S. A., 33 W. 42d st.
Stein, Gustave R., 144 W. 123d st.
Stern, Henry G., 3671 Broadway.
Stern, Leo, 924 West End ave.
Stern, Maurice M., 135 Central Park West.
Stewart, Howard T., 104 E. 40th st.
Stier, Julius J., 226 W. 78th st.
Stillman, Paul R., 115 Broadway.
Stoney, Arthur C., 515 Madison ave.
Strance, A. G., 315 Central Park West.
Strauss, Milton A., 2412 Seventh ave.
Strohmeyer, Joseph J., 167 W. 71st st.
Strong, Irving E., 1059 Tinton ave.
Sutherland, Arnold H., 28 W. 39th st.
Sweetser, R. W., 18 W. 34th st.
Swift, Arthur L., 140 W. 57th st.
Swift, Thomas, 1 Park ave., Mount Vernon, N. Y.
Sylla, E. W., 597 Fifth ave.
Taggart, Robert W., 330 Alexander ave.
Taylor, C. S., 102 W. 93d st.
Taylor, Herbert W., 58 W. 50th st.
Taylor, J. Ostram, 576 Fifth ave.
Terrell, Geo. B., 40 E. 41st st.
Thomas, J. D. V., 1 W. 34th st.
Thompson, Daniel B., 133 W. 72d st.
Throop, Harold M., 1384 Lexington ave.

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Tomlinson, Edward S., 40 E. 41st st.
Tooley, Francis L., 157 E. 79th st.
Tousey, Sinclair, 140 W. 57th st.
Tracy, Martin C., 46 W. 51st st.
Tracy, Wm. Dwight, 46 W. 51st st.
Trattner, Henry, 171 E. 81st st.
Turcot, T. G., 546 Fifth ave.
Turner, Frederick C., 505 Fifth ave.
Turner, W. J., 19 W. 54th st.
Tyrrell, Wm. Bell, 521 W. 111th st.
Vandervoort, J. C., 347 Fifth ave.
Van Saun, S. W., 250 W. 74th st.
Van Winkle, W. T., 59 W. 46th st.
Vaughan, Harold S., 616 Madison ave.
Vaughan, Ray G., 24 E. 48th st.
Veith, James H., 924 West End ave.
Vetter, Charles, 2 W. 88th st.
Vuilleumier, J. A., 58 E. 58th st.
Waddell, R. W., 45 W. 34th st.
Wakerly, Fred F., 2 Wall st.
Wald, Armin, 323 E. 86th st.
Walker, Alfred S., 38 W. 59th st.
Walker, Wm. Wallace, 58 W. 50th st.
Wardwell, Claison S., 576 Fifth ave.
Watson, John Russell, 576 Fifth ave.
Waugh, Leuman M., 576 Fifth ave.
Webster, William Lloyd, 101 W. 78th st.
Wehrenberg, W. D., 133 W. 72d st.
Weinberger, B. W., 40 E. 41st st.
Weld, Geo. W., 16 E. 23d st.
Weller, Franklin B., 239 W. 103d st.
Westbay, Henry E., 219 W. 71st st.
Wheeler, C. W. B., 17 E. 38th st.
Wheeler, Herbert L., 560 Fifth ave.
Wheeler, Isaiah N., 60 W. 51st st.
White, John E., 1328 Broadway.
Whitlock, W. Melvin, 11 E. 48th st.
Whitney, Edward P., 54 W. 48th st.
Willcox, Harry, 516 Fifth ave.
Williams, Percy N., 8 W. 40th st.
Willis, Geo. P., 949 Lexington ave.
Wilson, George A., Jr., 33 W. 42d st.
Wilson, Lawton H., 576 Fifth ave.
Witt, William, 1090 St. Nicholas ave.
Wolff, Alexander, 141 E. 34th st.
Wollison, R. M., 576 Fifth ave.
Wyant, William M., 201 W. 55th st.
Wynn, J. Frank, 17 E. 38th st.
Young, J. Lowe, 576 Fifth ave.
Zentler, Arthur, 8 W. 40th st.
Zimmerman, G. H., 167 W. 93d st.
Zweig, Jacob, 115 W. 119th st.

(Elected, but not yet qualified.)

Both, H. Spalding, 576 Fifth ave.
Clayton, Wiltshire C., 423 W. 120th st.
Finnegan, Fred'k L., 560 Fifth ave.
Gonzalez, Feliciano, 55 Irving Place.
Hatton, Thomas M., 200 Broadway.
Hazen, Bryant E., 1507 Aeolian Hall.
Jennings, Willoughby M., 616 Madison ave.
McCroskery, Willis R., 576 Fifth ave.
Parker, Harold J., 24 E. 48th st.
Swanson, F. J., 753 Fifth ave.
Woods, Carleton W., 576 Fifth ave.

HONORARY MEMBERS.

Ainsworth, George C., Boston, Mass.
Andrews, Prof. R. R., Cambridge, Mass.
Berens, T. Passmore, New York City.
Breneman, A. A. (Ph.D.), New York City.
Brophy, Truman W., Chicago, Ill.
Bryan, L. C., Basel, Switzerland.
Bryant, William S., New York City.
Case, Calvin S., Chicago, Ill.
Croll, W. L., London, Eng.
Cryer, Matthew H., Philadelphia, Pa.
Darby, Edwin T., Philadelphia, Pa.
Davenport, I. B., Paris, France.
Delevan, D. Bryson, New York City.
Elliott, W. St. George, New York City.
Gaylord, Edward S., New Haven, Conn.
Gies, Prof. Wm. J., Columbia University, New York City.
Goadby, Kenneth Weldon, London W., Eng.
Godon, Charles, Paris, France.
Goslee, Hart J., Chicago, Ill.
Grevers, John E., Utrecht, Holland.
Gysi, Alfred, Zurich, Switzerland.
Harmstad, Frank C., Jersey City, N. J.
Harvey, L. F., Buffalo, N. Y.
Hatch, Henry D., Temple, Maine.
Head, Joseph, Philadelphia, Pa.
Herbst, Wilhelm, Bremen, Germany.
Jarvie, William, Montclair, N. J.
Kimball, Charles Otis, New York City.
Kirk, Edward C., Philadelphia, Pa.

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Lewis, F. Parke, Buffalo, N. Y.
Lloyd-Williams, E., London, S. W., England.
McManus, James, Hartford, Conn.
McQuillen, Daniel Neill, Philadelphia, Pa.
Marshall, John S., Washington, D. C.
Morton, William J., New York City.
Newton, Richard C., Montclair, N. J.
Osborn, Prof. H. F., New York City.
Phillips, Wendell C., New York City.
Pullen, H. A., Buffalo, N. Y.
Taggart, William H., Chicago, Ill.
Tomes, Charles S., London, England.
Waite, W. H., Liverpool, England.
Williams, J. Leon, London, England.
Wilson, Frederick N., New York City.
Wortman, Prof. J. L., New Haven, Conn.
Younger, William J., Paris, France.

LIFE MEMBERS.

Angle, Edward H., Pasadena, Cal.
Brunton, George, Leeds, England.
Dahlgren, B. E., Chicago, Ill.
Eddy, Forest G., Providence, R. I.
Frick, Theodore, Zurich, Switzerland.
Hugenschmidt, A. C., Paris, France.
Smale, Morton, London E., England.
Smith, B. Holly, Baltimore, Md.
Taylor, James W., New York City.
Taylor, L. C., Hartford, Conn.
Trueman, Wm. H., Germantown, Pa.
Watson, Milton T., Detroit, Mich.
Wilson, George A., Amityville, L. I.

Second District.

THE annual meeting of the Second District Dental Society of the State of New York was held on April 9, 1917, and the following persons were elected officers for the ensuing year:

President—R. Ottolengui.
Vice-president—F. T. Van Woert.
Recording Secretary—G. W. Gardner.
Corresponding Secretary—C. B. Whitcomb.
Treasurer—C. A. Gomer.
Librarian—T. A. Quinlan.
Members of Executive Council—H. P. Gould (regular), W. N. Frazer (alternate).

The following were elected to serve on State Society committees: F. O. Kraemer (Law); A. H. Stevenson and H. C. Croscup (Oral Hygiene).

The following have died during the year—W. H. Clark, Theo. Siqueland, and W. W. Thompson.

The total membership of the society is now 271 active, 7 honorary, 8 life members, and 1 army and navy member.

Respectfully submitted,

G. W. GARDNER, *Rec. Sec'y.*

ACTIVE MEMBERS.

(Resident in Brooklyn unless otherwise specified.)

Adams, F. R., 861 Manhattan ave.
Allen, C. C., 105 Clinton st.
Allen, N. H., 444 Franklin ave.
Allyn, F. L., Woodhaven, N. Y.
Alexander, Albert A., 850 22d ave.
Arvine, F. B., 793 Lincoln Place.
Ayres, Herbert D., 171 Union st., Flushing, N. Y.
Babcock, E. H., 184 Joralemon st.
Babcock, L. H., 2118 Beverly road.
Bade, Henry, 136 Halsey st.
Barnes, F. D., 178 Stuyvesant ave.
Bauer, A. F., 154 Nassau st., New York City.
Bauer, W. C., 1116 Bushwick ave.
Beissel, Wm. J., 1004 Broadway.
Berendsohn, E. H., 204 Berkley Place.
Berendsohn, W. A., 598 Carlton ave.
Boley, Jerome A., 11 Weirfield st.
Bornman, Carl F., 67 Hanson Place.
Boudin, Anna P., 477 E. 16th st.
Boylhart, F., 129 St. Felix st.
Briggs, E. T., 354 Ocean ave.
Brown, Byron, 77 Hanson Place.
Brown, Harold Watkins, 110 S. Elliott Place.
Brown, J. B., 80 Lafayette ave.
Brush, Roger C., Huntington, L. I.

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Buchenholz, Ira, 258 Hart st.
Buckley, W. A., Liberty, N. Y.
Burgess, F. L., Huntington, N. Y.
Burgun, J. A., 184 Joralemon st.
Bush, C. A., 126 Hancock st.
Bush, W. N., 183 Halsey st.
Campbell, D. K., 436 Gold st.
Carpenter, W. T., 191 Ryerson st.
Chambers, E. J. C., 42 Fourth ave.
Childs, Henry M., 67 Hanson Place.
Clark, R. H., 350 Carlton ave.
Clark, W. P., 26 Seventh ave.
Clark, Julian H., 531 Fulton st.
Clasing, J. F. W., 283 President st.
Clayton, Furman, 469 Franklin ave.
Coe, Thomas C., 508 E. 5th st.
Cook, F. W., 44 Court st.
Cook, J. D., 81 Reid ave.
Croscup, H. C., 327 Sterling Place.
Crossman, Victor W., 136 Fort Greene Place.
Cuinet, L. A., 152 Henry st.
Cuneo, C. M., 590 E. 21st st.
Davis, G. E., 1225 Bushwick ave.
Dawson, E. B., 111 Reid ave.
Dayton, C. R., 488 Nostrand ave.
Deale, W. H., Babylon, L. I.
DeBar, Wm., 260 Ovington ave.
Desnoes, A. M., 488 Nostrand ave.
Dills, W. B., 33 W. 42d st., New York City.
Douglas, G. C., 540 Putnam ave.
Dunlop, C. H., 145 Halsey st.
Easley, S. H., 17 Covert st., Port Washington, L. I.
Edwards, L. S., 113 S. Elliott Place.
Engel, P. B., 10 Stuyvesant ave.
Engel, W. F., 10 Stuyvesant ave.
Ewald, Martha R., 1211 ave. N.
Filler, Julius, 68 McKibben st.
Finney, J. H., 333 McDonough st.
Fischler, B., 120 Reid ave.
Frazer, Wm. N., 184 McDonough st.
Fuchs, W. J., 199 Gates ave.
Fuller, Z. P., 110 S. Elliott Place.
Gardner, G. W., 184 Joralemon st.
Gelson, J. N., 282 Park Place.
Gesell, C. L., 683 Flatbush ave.
Gesell, H. R., 709 Manhattan ave.
Gilman, R. E., 33 Lafayette ave.
Gilcrest, H. C., Nyack, N. Y.
Glenzer, J. A., 593 Hancock st.
Glover, B. W., 34 Clarkson st.
Goldberger, M. M., 1932 Bergen st.
Gomer, C. A., 770 Willoughby ave.
Gough, F. A., 184 Joralemon st.
Gould, H. P., 181 Joralemon st.
Greene, H. C., 228 Cumberland st.
Greeneberg, A., 4721 14th ave.
Greismer, M. F., 364 McDonough st.
Haas, H., 240 Covert st.
Haley, J. F., 840 Herkimer st.
Halsey, W. E., 203 Jefferson ave.
Hamlet, F. P., Hempstead, L. I.
Hankinson, M. C., 201 Schermerhorn st.
Harby, R. D., 792 Lincoln Place.
Held, John W., 826 Rogers ave.
Heilig, S. E., 280 Flatbush ave.
Herman, Leo, 4721 12th ave.
Hillyer, Ellison, 1143 Dean st.
Hirschman, H. S., 296 Richmond ave., Port Richmond, Staten Island, N. Y.
Hoch, B. L., 130 Reid ave.
Hoch, Samuel, 130 Reid ave.
Holbrook, E. A., 67 Hanson Place.
Holch, H. G., 155 Gates ave.
Holmboe, Birger, 162 Montague st.
Holmes, J. H., 107a Halsey st.
Holzman, Mayer P., 1024 Bushwick ave.
Hopkins, S. P., 184 Joralemon st.
Hummel, C. F., 184 Joralemon st.
Hunter, Arthur M., 1 Madison ave., N. Y. C.
Husch, Jacob, 269½ Vernon ave.
Huskinson, Ernest C., 1246 Pacific st.
Hyatt, T. P., 576 Fifth ave., New York City.
Jarvie, Wm., 19 W. 45th st., New York City.
Joffe, M. S., 72 Manhattan ave.
Johnson, A. S., 1203 Dean st.
Johnston, W. H., 35 Fort Greene Place.
Jones, C. C., 828 Flatbush ave.
Kaletsky, C. M., 297 Fulton st., Jamaica, N. Y.
Kalkbrenner, Carl E., 2421 Silver st.
Keowen, S. S., 24 New York ave.
Keppy, F. B., 62 Hancock st.
Ketcham, F. S., 141 Hancock st.
King, H. W., 85 Main st., Flushing, N. Y.
Knight, G. W., 28 Cambridge Place.
Knox, John T., 184 Joralemon st.
Kohn, Leonard, 184 Cornelia st.
Koob, J. J., 401 Grove st.
Kraemer, F. O., 225 Schermerhorn st.
Kraemer, F. O., Jr., 225 Schermerhorn st.
Kregeloh, H. A., 170 N. 6th st.
LaBorne, Chas. H., 792 Nostrand ave.
Lanchantin, E. F., 360-a Ninth st.
Lando, S. A., 27 Grand ave., Corona, N. Y.
Lawrence, A. L., 85 Main st., Flushing, N. Y.
Lawrence, W. E., 1 Revere Place.
Lehmann, E., 194 Ridgewood ave.

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Leonard, M. D., 30 Linden ave.
Leonard, R. G., 30 Linden ave.
Leprohohn, J. B., 105 Quincy st.
Lewis, J. M., 50 Lenox road.
Lewis, W. G., 184 Joralemon st.
Lief, J. F., 349 Vernon ave.
Lienau, R. C., 137 Bainbridge st.
Long, Orville S., 781 Ocean ave.
Lundgren, C. J., 1241 Broadway.
McAteer, J. L., 4430 18th ave.
McCushing, G. J. B., 440 Lefferts ave., Richmond Hill, L. I.
McNeill, E. W., 65 St. Johns Place.
Machat, B. B., 8679 20th ave.
Malcolm, James A., Oyster Bay, N. Y.
Mann, John, Jr., Bayshore, L. I.
Mapp, C. J., 44 Court st.
Marshall, E. W., 144 Park Place.
Master, C. M., Flushing, N. Y.
Master, E. A., 181 Joralemon st.
Matt, O. T., 696 Park Place.
McGaw, E. E., 1166 Dean st.
Merwin, R. E., 796 Carroll st.
Michnoff, S. J., Bay Shore, L. I.
Miller, F. H., 310 Cumberland st.
Miller, Francis H., 617 McDonough st.
Miller, Irving U., 284 Henry st.
Mogk, W. C., 223 St. Nicholas ave.
Morris, Frank, 1279 Bedford ave.
Morris, W. A., 657-a Macon st.
Morrison, E. V., 67 Hanson Place.
Moss, H. M., 327 Eastern Parkway.
Muth, George H., 1124 Ocean ave.
Neurohn, F. G., 519 8th ave.
Newton, H. A., 151 Clinton st.
Nies, Fred. H., 79 Hamilton ave.
Nodine, A. M., 8 W. 40th st., New York City.
Norcom, C. M., 1187 Bergen st.
O'Brien, H. L., 104 Prospect Park West.
O'Connell, M. F., Corona, N. Y.
Orr, C. W., 100 Hanson Place.
Ottolengui, R., 8 W. 40th st., New York City.
Orth, Fred. C., 612 Benedict ave., Woodhaven, N. Y.
Paaswell, Benjamin, 974 St. Marks ave.
Parker, C. B., 154 Clinton st.
Parker, DeWitt L., 178 State st.
Parker, D. B., 154 Clinton st.
Parker, V. F., 124 Montague st.
Pensak, Julius, 1476 Pitkin ave.
Perlie, H. E., 1430 G st. N. W., Washington, D. C.
Peterson, J. O., 216 Bergen st.
Peterson, T. O., 158 6th ave.
Phillips, P. J., 129 S. Oxford st.
Powell, J. K., Jr., 175 Hancock st.
Provost, W. D., 80 Lafayette ave.
Pyle, D. F., 174 Pierrepont st.
Quackenbush, H. W., 473 Washington ave.
Quackenbush, Frank, Northport, L. I.
Quinlan, J. S., 76 6th ave.
Quinlan, T. A., 463 Fulton st.
Quinn, A. M., 16 7th ave.
Ralph, Edward D., 40 Flushing ave., Jamaica, L. I.
Rasi, H. S., 157 Clinton st.
Reese, R. H., 103 Macon st.
Riggs, W. C., 67 Hanson Place.
Ritt, Adolph, 1621 Pitkin ave.
Rogers, W. H., 506 Hancock st.
Rosenthal, A. D., 248 Fulton ave., Hempstead, L. I.
Rothenberg, Max, 52 Thatford ave.
Royce, F. C., 65 Greene ave.
Russell, J. W., 6 Plaza st.
Ruyl, J. P., 40 E. 41st st.
Sanbern, Frank, 184 Joralemon st.
Sanderson, R. H., 76 Rogers ave.
Sandhusen, G., 298 Cumberland st.
Sandiford, H. E., 73 St. Marks ave.
Sachter, H. G., 375 E. 15th st.
Scheiner, Karl, 1829 Gates ave.
Schmidt, J. A., 1195 Dean st.
Schreiber, G. J., 758 Flushing ave.
Schreiber, Milton, 130 Pennsylvania ave.
Schmitt, E. W., 67 Hanson Place.
Schundt, J. E., 1195 Dean st.
Schumacher, F. H., 1307 Bushwick ave.
Scofield, F. E., 87 Macon st.
Scofield, W. L., Brewster, N. Y.
Seaver, A. D., 134 Park Place.
Sexton, E. K., 632 Throop ave.
Seyfarth, G. E., 17 Palmetto st.
Shankroff, Louis, 334 Jefferson ave.
Shapiro, Benjamin, 1480 Eastern Parkway.
Shapiro, B. D., 1808 Prospect Place.
Shapiro, Jacob, 430 Stone ave.
Shapiro, Simon, 1174 Eastern Parkway.
Shea, B. F., 324 Stuyvesant ave.
Shields, J. F., 585 Jefferson ave.
Shuayerson, S., 61 Tompkins ave.
Sloman, John J., 731 Hancock st.
Small, E. W., 1571 Broadway.
Smith, Chas. E., Mineola, N. Y.
Smith, D. L., Far Rockaway, N. Y.
Snyder, L. A., 108 S. Portland ave.
Solomons, J. R., 1 W. 34th st., New York City.
Specht, Emil, 276 Sackett st.

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Staats, G. E., 718 Macon st.
Steinbuch, Wm., 940 Bushwick ave.
Stevens, H. P., 64 Court st.
Stevenson, A. H., 576 Fifth ave., New York City.
Sternbortz, A., 1598 Pitkin ave.
Stillman, E. E., 178 Prospect Park West.
Stillman, J. C., 184 Joralemon st.
Stoltze, V. A., 67 Hanson Place.
Sullivan, J. E., 360 Tompkins ave.
Sullivan, W. F., 60 Broadway, New York City.
Sussman, Samuel, 134 Sumner ave.
Shanahan, T. E. J., 501 59th st.
Toshack, E. W., 267 New York ave.
Turner, Wm. J., 19 W. 54th st., New York City.
Tuttle, J. H., Jr., 184 Joralemon st.
Van Note, F. L., 512 Ocean ave.
Van Orden, Chas. A., 144 Lawrence st.
Van Woert, C. T., 184 Joralemon st.
Van Woert, F. T., 184 Joralemon st.
Voegtlen, P. G., 441 9th st.
Walker, F. C., 309 State st.
Wallace, E. C., 50 Macon st.
Warden, F. E., 242 McDonough st.
Warren, Edward B., 11 Schenck ave.
Washburn, E. P., 416 50th st.
Watson, Walter S., 5 McDonough st.
Webb, Thomas C., 8687 22d ave.
Wengorovius, W. R., 35 W. 42d st., N. Y. C.
Whaley, E. G., 642 Park Place.
Whitcomb, C. B., 67 Hanson Place.
White, G. W., 309 13th st.
Wicks, J. V. P., 108 Fort Greene Place.
William, Maurice, 699 Manhattan ave.
Wilson, W. W., 485 Lafayette ave.
Wolf, P. F., 1025 Bushwick ave.
Wolkin, George, 241 Euclid ave.
Wood, John, 235 Jefferson ave.
Wyckoff, J. R., 279 Madison st.
Zametkin, J. M., 101 Second Place.
Zulauf, A. F., 1195 Dean st.

HONORARY MEMBERS.

Ash, Chas. F., 115 Broadway, N. Y. C.
Goslee, H. J., 108 N. State st., Chicago, Ill.
Hutchinson, R. G., Jr., 8 W. 40th st., N. Y. C.
Jackson, V. H., 40 E. 41st st., N. Y. C.
Jenkins, N. S., New Haven, Conn.
Taggart, W. H., 538 S. Clark st., Chicago, Ill.
Voelker, Chas. C., Philadelphia, Pa.

LIFE MEMBERS.

Abbott, F. P., 33 Cambridge Place.
Emerson, F. S., 632 Bedford ave.
Holly, R. T., 155 Montague st.
Houghton, O. E., 126 S. Oxford st.
Hull, P. L., Jamaica, N. Y.
Parker, E. G., Goshen, N. Y.
Ramsdell, W. M., Oxford, Chenango Co., N. Y.
Rippier, E. T., 350 9th ave.

ARMY AND NAVY MEMBERS.

Harvey, H. E., Navy Yard, Brooklyn.

Third District.

THE annual meeting of the Third District Dental Society of the State of New York was held on April 17, 1917, and the following persons were elected officers for the ensuing year:

President—J. H. Carter.
Vice-president—J. W. Canaday, Jr.
Recording Secretary—E. H. Gale.
Corresponding Secretary—H. G. Kittell.
Treasurer—P. S. Oakley.
Librarian—Geo. Vanderpool.
State Dental Examiners—A. M. Wright, C. K. Van Vleck.

The following were appointed to serve on State Society committees:

Geo. Vanderpool (Legislative); J. H. Carter and M. E. Brown (Oral Hygiene).

Since our last annual meeting we have lost

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three members; two resigned and one was dropped for non-payment of dues. Four new members were elected.

The use of the X-ray is increasing in our district, several of our members having machines, and making their own roentgenograms.

Respectfully submitted,

J. W. CANADAY, JR., *Rec. Sec'y.*

ACTIVE MEMBERS.

Allen, C. E., 24 Dove st., Albany.
Ames, F. L., 64 Swan st., Albany.
Amyot, B. E., 67 Remsen st., Cohoes.
Amyot, J. A., Kar. Bldg., Cohoes.
Appleton, G. N., Ten Broeck st., Albany.
Appleton, J. L., 522 Madison ave., Albany.
Appleton, J. L., Jr., 522 Madison ave., Albany.
Barlow, G. F., Hudson.
Barrett, M. J., 1830 Fifth ave., Troy.
Behrens, Henry, Jr., Kingston.
Bennett, E. A., 401 Main st., Catskill.
Betts, F. S., Kingston.
Bird, C. H., 59 Fourth st., Troy.
Bishop, C. H., Kingston.
Bean, W. E., Troy.
Blatner, L. S., 346 State st., Albany.
Boudrias, Louis, 257 Columbia st., Cohoes.
Brown, M. E., 90 State st., Albany.
Caddick, G. H., 53 Dove st., Albany.
Cahill, A. T., Hoosick Falls.
Canaday, J. W., 283 State st., Albany.
Canaday, J. W., Jr., 283 State st., Albany.
Carter, C. D., Kingston.
Carter, J. H., 145 Mohawk st., Cohoes.
Conkling, W. A., Catskill.
Cragin, A. M., Kingston.
Cragin, C. B., Kingston.
Doyle, T. A., 157 Central ave., Albany.
Ellis, Richard, 1913 Fifth ave., Troy.
Englert, G. A., 360 Main st., Catskill.
Fallon, H. C., 812 River st., Troy.
Fabyan, W. D., Philmont.
Fitzgerald, M. A., 99 N. Pearl st., Albany.
Fitzsimmons, J. A., 37 Central ave., Albany.
Gale, E. H., 90 State st., Albany.
Gale, L. J., 18 S. Pearl st., Albany.
Gallico, J. E., 40 Third st., Troy.
Hawkins, F. F., 95 Fourth st., Troy.
Hayner, F. B., Troy.
Herbert, O. N., 37 Third st., Troy.
Hudson, W. A., 94 Washington ave., Albany.
James, L. R., Hudson.
Kirwan, M. F., 31 Central ave., Albany.
Kittell, H. G., 620 Second ave., Troy.
Knapp, G. O., 41 Fourth st., Troy.
Le Blanc, P. A., 32 N. Pearl st., Albany.
Levitas, S. T., Kingston.
Lynam, H. D., 351 Broadway, Troy.
McCarthy, W. E., 457 Broadway, Troy.
McCormack, E. P., 95 N. Pearl st., Albany.
McCormick, F. S., 46 Third st., Troy.
McCormick, J. J., 453 Broadway, Troy.
McDonald, D. K., 61 Columbia st., Albany.
McKeon, F. J., 64 N. Pearl st., Albany.
Maby, E. R., Mechanicsville.
Mann, Josiah, Middleburgh.
Michael, R. C., Philmont.
Michel, F. G., 52 N. Pearl st., Albany.
Murphy, Alice, Hoosick Falls.
Murphy, R. A., 34 Eagle st., Albany.
Myers, A. H., 82 Swan st., Albany.
Norton, A. J., 114 Market st., Saugerties.
O'Brien, F. D., The Fort Frederick, Albany.
Oakley, P. S., 1647 Fifth ave., Troy.
Perras, E. A., 467 Fifth ave., Troy.
Rieger, A. B., 105 Mohawk st., Cohoes.
Reynolds, S. S., 25 Central ave., Albany.
Rowe, M. L., 142 Washington, ave., Albany.
Rowley, H. S., 35 High st., Hoosick Falls.
Scranton, S. A., Schoharie.
Stevens, W. E., Windham.
Sullivan, G. A., 18 Dove st., Albany.
Vanderpool, Geo., 90 State st., Albany.
VanLoan, Morton, 82 Swan st., Albany.
Van Vleck, C. K., 536 Warren st., Hudson.
Warren, W. A., 1569 First ave., Watervliet.
Weston, R. B., 355 State st., Albany.
Whitbeck, T. H., 44 Eagle st., Albany.
Wright, A. M., 4 St. Paul Place, Troy.

HONORARY MEMBERS.

Angle, Edw. H., New London, Conn.
McKay, Jos. (M.D.), Troy.
Shields, Nelson T., New York City.

LIFE MEMBERS.

Garvey, P. S., Hudson.
Nelson, H. G., Troy.
Young, E. J., Troy.

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Fourth District.

THE annual meeting of the fourth District Dental Society of the State of New York was held on January 16, 1917, and the following persons were elected officers for the ensuing year:

President—G. H. Hiney.
Vice-president—J. Finley Wark.
Recording Secretary—H. V. Gregg.
Corresponding Secretary—W. D. Rose.
Treasurer—O. J. Gross.
Librarian—(Sec'y).
State Dental Examiner (term to expire 1919)—O. J. Gross, Schenectady.
Member of Executive Council—A. C. Rich, Saratoga.

The following were appointed to serve on State Society committees: E. B. Rhinehart (Legislative); L. A. Timerman and S. A. Demarest (Oral Hygiene).

There have been several names stricken from active list for non-payment of dues.

Respectfully submitted,
HARRY V. GREGG, *Rec. Sec'y.*

ACTIVE MEMBERS.

Alexander, Wm. H., Johnstown.
Amyot, P. A., Schenectady.
Barraclough, J., Hudson Falls.
Barrett, A. Gardner, Granville.
Betts, Geo. M., Schenectady.
Boule, Isidore A., Plattsburg.
Brown, Geo., Glens Falls.
Butler, Harry B., Ogdensburg.
Carpenter, B. F., Whitehall.
Clark, F. P., Mechanicsville.
Coleman, S. E., Malone.
Colgrove, W. H., Johnstown.
Collins, J. H., Granville.
Conner, W. R., Gouverneur.
Cooney, Thomas S., Schenectady.
Culliney, M. M., Greenwich.
Day, F. C., Lake Placid.
Demarest, S. A., Glens Falls.
Duignan, R. E., Gloversville.
Embler, Ralph, Schenectady.
Facteau, Henry C., Tupper Lake.
Fielding, F. A., Glens Falls.
Foote, LeRoy, Saratoga.
Foote, N. E., Whitehall.
Foulds, T. H., Glens Falls.
Gabler, L. C., Schenectady.
Githins, W. L., Fort Edward.
Goetz, St. E., Schenectady.
Greenwald, Joseph, Schenectady.
Gregg, H. V., Schenectady.
Grennan, F. T., Schenectady.
Gross, O. J., Schenectady.
Haselo, Frederick W., Schenectady.
Hastings, J. M., Saratoga.
Hill, Robert C., Schenectady.
Hiney, G. H., Cambridge.
Kinum, Albert G., Schenectady.
Hodder, C. A., Canajoharie.
Hogne, R. A., Plattsburg.
Hull, J. B., Schenectady.
Jackson, H. C., Schenectady.
Lord, C. N., Schenectady.
McCann, H. H., Glens Falls.
McCarthy, Frank P., Schenectady.
McCullough, Earl C., Gloversville.
McNulty, Thomas P., Gouverneur.
Mabie, Wm. A., Amsterdam.
Maier, Paul G., Schenectady.
Maloney, J. D., Hudson Falls.
Mead, Harold R., Schenectady.
Moore, A. S., Schenectady.
Munroe, John A., Saranac Lake.
Petrie, R. C., Johnstown.
Porter, R. N., Malone.
Powers, N. C., Saratoga.
Rhinehart, E. B., Schenectady.
Rich, A. C., Saratoga.
Roberts, D. S., Gloversville.
Rose, Wilbur D., Schenectady.
Rose, W. S., Schenectady.
Sayres, R. D., Gloversville.
Scott, Robert J., Port Henry.
Shannon, Geo. H., Cambridge.
Shaw, E. D., Gloversville.
Sitterly, A. T., Schenectady.
Skinner, Perry R., Amsterdam.
Steer, H. G., Fort Plain.
Stowitts, H. M., Amsterdam.
Taylor, F. E., Malone.
Tibbetts, W. H., Ballston Spa.
Timerman, L. A., Fort Plain.
Timeson, Earl, Schenectady.

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Van Alstyne, Earl Z., Schenectady.
Van Wie, P. B., Canajoharie.
Vaughan, H. E., Ogdensburg.
Ward, G. E. T., Schenectady.
Wark, J. Finley, Corinth.
Webster, C. E., Gouverneur.
White, James D., Amsterdam.
Whitmyre, R. H., Schenectady.
Wilson, Wm. H., Saranac Lake.
Wolcott, C. H., Schenectady.
Wood, Edward A., Mechanicsville.
Woolsey, Geo., Fonda.
Wright, Frank, Ticonderoga.

HONORARY MEMBERS.

Garrett, Jas. S., Glens Falls.
Burnett, J. K., Fort Plain.

LIFE MEMBERS.

Doolittle, E., Schuylerville.
Hawley, A. F., Waterford.
Rossiter, A. A., Saratoga.
Weed, P. W., Saratoga.

Fifth District.

THE annual meeting of the Fifth District Dental Society of the State of New York was held April 13 and 14, 1917, and the following persons were elected officers for the ensuing year:

President—C. M. Ryan, Syracuse.
Vice-president—B. T. Mason, Fulton.
Recording Secretary—L. W. Platner, Utica.
Correspondent—E. I. Harrington, Watertown.
Treasurer—J. S. Hall, Syracuse.
Censors—S. Slocum, Oswego; E. E. Harrington, Watertown; G. H. Butler, Syracuse.
State Dental Examiners—A. R. Cooke and Sheridan Slocum (terms to expire in 1920).
Members of Executive Council—George B. Beach (regular) and Sheridan Slocum (alternate).

The following were appointed to serve on State Society committees: T. R. Cullen (Legislative); G. B. Parker and I. J. Coe (Oral Hygiene).

Two regular meetings were held during the past year, the semi-annual at Buffalo, in union with the Sixth, Seventh, and Eighth districts, and the annual at Syracuse.

Nineteen new members were taken in during the past year.

Respectfully submitted,

B. T. MASON, *Rec. Sec'y.*

ACTIVE MEMBERS.

Barker, W. A., 800 University Bldg., Syracuse.
Barnes, C. H., 912 University Bldg., Syracuse.
Barrett, J. J., 515 Union Bldg., Syracuse.
Barry, R. W., E. 2d and Bridge sts., Oswego.
Beach, G. B., 518 S. A. & K. Bldg., Syracuse.
Benz, F. W., 622 O. C. S. Bank Bldg., Syracuse.
Benz, J. C., 622 O. C. S. Bank Bldg., Syracuse.
Bickelhaupt, A. C., 4th Floor, City Bank Bldg., Syracuse.
Billington, B. H., 2 Hendricks Bldg., Syracuse.
Box, J. F., Sandy Creek, N. Y.
Bradshaw, C. A., 402 S. Salina st., Syracuse.
Brooks, G. K., 520 Gurney Bldg., Syracuse.
Butler, G. H., 715 University Bldg., Syracuse.
Capron, W. B., Utica.
Carroll, J. F., City Bank Bldg., Syracuse.
Casler, R. F., Watertown.
Cheney, H. A., Smith Bldg., Watertown.
Clapp, H. M., Utica.
Clifford, W. D., 427 N. Salina st., Syracuse.
Coe, I. J., 718 S. A. & K. Bldg., Syracuse.
Cook, A. R., 815 University Bldg., Syracuse.
Coxon, Rose, 409 Mayer Bldg., Utica.
Craner, C. M., 902 University Bldg., Syracuse.
Cullen, T. R., Oswego.
Cummings, J. E., 513 O. C. S. Bank Bldg., Syracuse.
Darrone, L. O., 710 Dillaye Mem. Bldg., Syracuse.
Davis, C. H., Pulaski.
Davis, J. L., 304 Dillaye Mem. Bldg., Syracuse.
Dommett, H. M., Ilion.

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Dower, J. H., University Bldg., Syracuse.
Earl, Fred W., 2 Y. M. C. A. Bldg., Watertown.
Eicholtz, R. W., 714 University Building, Syracuse.
Engle, F. W., Liverpool.
Eveleigh, E. J., 617 O. C. S. Bank Building, Syracuse.
Fisher, F. W., 415 Union Bldg., Syracuse.
Folley, J. F., 320 Coleridge ave., Syracuse.
Fowler, C. S., Watertown.
Garlinghouse, J. N., Clinton.
Garrison, L. F., Dillaye Mem. Bldg., Syracuse.
Gillick, F. M., Theresa.
Gould, L. A., Watertown.
Gowland, W. G., City Bank Bldg., Syracuse.
Greminger, G. K., 935 O. C. S. Bank Bldg., Syracuse.
Grout, J. J. Skaneateles.
Guillaume, H. F., Utica.
Hall, J. S., 423 University Bldg., Syracuse.
Harrington, E. E., Watertown.
Harrington, E. I., Watertown.
Hastings, R. E., 190 Genesee st., Utica.
Hatfield, Wm. J., Utica.
Head, Geo. T., 314 Dillaye Mem. Building, Syracuse.
Heintz, Wm. J., 614 Columbia st., Utica.
Hitzelberger, A. C., Utica.
Hughes, R. F., 522 O. C. S. Bank Building, Syracuse.
Jones, R. E., Remsen.
Jones, W. B., 319 Union Bldg., Syracuse.
Jones, Wm. H., Clinton.
Jutten, Daniel, 727 University Bldg., Syracuse.
Kelley, J. Otis, 325 Rosenbloom Building, Syracuse.
Knapp, Paul C., 112 Oneida st., Fulton.
Kratzer, E. R., Baldwinsville.
Lafayette, A. M., 725 Univ. Bldg., Syracuse.
Leak, W. H., Watertown.
Luther, H. E., 801 O. C. S. Bank Building, Syracuse.
McCormack, Frank W., W. Bridge st., Oswego.
McCraith, T. E., Fort Schuyler Bldg., Utica.
Markham, P. H., 912 Univ. Bldg., Syracuse.
Mason, B. T., Fulton.
Mason, G. B., Utica.
Mills, F. L., Baldwinsville.
Mount, M. T., Cato.
Moyer, W. H., 12 W. Genesee st., Baldwinsville.
Murray, W. G., Herkimer.
Neff, E. R., Carthage.
North, J. H., 441 S. Salina st., Syracuse.
Osgood, A. K., Ilion.
Parker, G. B., Watertown.
Payne, W. B., Watertown.
Perry, Geo. I., 318 Union Bldg., Syracuse.
Peters, C. J., 812 University Bldg., Syracuse.
Platner, L. W., Utica.
Potter, G. A., Cape Vincent.
Prichard, J. T., Camden.
Redway, R. B., Ilion.
Retter, A., Utica.
Roblin, A. C., 474 N. Salina st., Syracuse.
Roblin, H. M., 617 O. C. S. Bank Building, Syracuse.
Rogers, E. G., Sandy Creek.
Roth, G. S., 510 Gurney Bldg., Syracuse.
Ryan, C. M., 512 University Bldg., Syracuse.
Sayers, C. A., 514 Gurney Bldg., Syracuse.
Schafer, G. P., 414 Gurney Bldg., Syracuse.
Schamu, C. G., 704 University Bldg., Syracuse.
Schotthafer, Edward, Utica.
Silverman, I. L., 541 E. Genesee st., Syracuse.
Sinclair, H. A., 169 W. Dominick st., Rome.
Slocum, Sheridan, Oswego.
Smith, A. F., 514 University Bldg., Syracuse.
Smith, E. A., Rome.
Sontheimer, A. F., 122 E. Dominick st., Rome.
Spriggs, C. J., Rome.
Stillman, A. A., Gurney Bldg., Syracuse.
Sullivan, J. C., Little Falls.
Stuart, Anna, 103 Seitz Bldg., Syracuse.
Talley, D. B., 714 Dillaye Mem. Building, Syracuse.
Tanzer, J. M., Little Falls.
Tanzer, W. B., Watertown.
Terry, M. J., Dept. of Education, Albany.
Tompkins, H. H., Utica.
Tremain, W. F., Rome.
Turner, R. C., Oswego.
Webb, E. R., 415 University Bldg., Syracuse.
Wells, A. D., Skaneateles.
Wells, I. G., Holland Patent.
White, E. R., 718 S. A. & K. Bldg., Syracuse.
Whitney, H. M., 910 Univ. Bldg., Syracuse.
Williams, E. B., 351 Genesee st., Utica.
Wright, G. L., 202 W. Genesee st., Syracuse.

LIFE MEMBERS.

Cherry, C. E., 612 Univ. Bldg., Syracuse.
Tibbets, F. G., Fayetteville.

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Sixth District.

THE annual meeting of the Sixth District Dental Society of the State of New York was held March 29, 30, and 31, 1917, in Elmira, and the following persons were elected officers for the ensuing year:

President—James T. Ivory.
Vice-president—G. A. Burdick.
Recording Secretary—H. V. Heiss.
Treasurer—E. L. Pitcher.

The following were appointed to serve on State Society committees: Fred Ford (Law); W. J. Le Seur (Legislative); H. D. Whitmarsh and F. M. Willis (Oral Hygiene).

Respectfully submitted,

H. V. HEISS, *Rec. Sec'y.*

ACTIVE MEMBERS.

Anderson, Wm. T., Endicott.
Arbuckle, J. H., Delhi.
Barnes, A. S., Oneonta.
Barton, W. W., Binghamton.
Barnett, John, Elmira.
Bassett, C. G., Sidney.
Baylis, C. F., Oneonta.
Bond, F. E., Binghamton.
Burdick, G. A., Homer.
Burghardt, H. D., Whitney Point.
Champlin, F. W., Oneida.
Chapman, B. I., Elmira.
Cowan, J. H., Cortland.
Cox, E. W., Horseheads.
Crawford, J. R., Ithaca.
Crowley, A. J., Ithaca.
Cull, H. J., Cazenovia.
Cunningham, H. E., Hobart.
Curtis, H. A., Waverly.
Decker, Geo. M., Owego.
Denike, G. A., Binghamton.
Dolan, B., Binghamton.
Dunne, C. M., Norwich.
Faulkner, J. V., Oneida.
Fitch, H. E., Elmira.
Ford, F. A., Cazenovia.
Frisbie, J. D., Andes.
Gainsway, L. F., Greene.
Garling, N. L., Ithaca.
Garvin, F. A., Oneida.
Gill, E. S., Morrisville.
Gillespie, E. R., Binghamton.
Griswold, G. N., Unadilla.
Hamilton, H. B., Ithaca.
Hanks, C. S., Oneonta.
Hasse, F., Jr., Elmira.
Heiss, H. V., Johnson City.
Hill, Wm. L., Owego.
Hixon, W. W., Hamilton.
Howe, Fred. B., Owego.
Howe, J. B., Owego.
Ingalls, C. E., Cortland.
Ingalls, L. S., Cortland.
Ivory, James T., Binghamton.
Jenks, F. M., Ithaca.
Johnson, R. A., Bainbridge.
Kaley, M., Johnson City.
Kelley, J. D., Binghamton.
Kingsley, R. R., Ithaca.
Le Suer, W. J., Oneonta.
McCall, F. W., Binghamton.
Madison, G. E., Binghamton.
Mayor, Wm. E., Owego.
Miller, Earl, Elmira.
Miller, H. J., New Berlin.
Mills, James, Waverly.
Mitchell, H. B., Elmira.
Moore, H. A., Elmira.
Needham, A. V., Oneida.
Nelson, E., Waverly.
Noble, L. E., Endicott.
Nordike, J. L., Watkins.
Nutt, D. W., Walton.
Ogden, J. D., Binghamton.
Ogden, Wm. A., Binghamton.
Peters, A. S., Worcester.
Peterson, H. A., Worcester.
Pitcher, E. L., Cooperstown.
Pritchard, W. H., Newark Valley.
Pulver, Geo. W., Binghamton.
Roe, M. N., Owego.
Root, R. T., Binghamton.
Schaffer, J. H., De Ruyter.
Sainburg, P. C., Ithaca.
Sears, Claude C., Trumansburg.
Sharp, W. M., Binghamton.
Smith, F. A., Oneonta.
Smith, F. W., Elmira.
Smith, Herman L., Trumansburg.
Smith, Julian, Union.

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Snook, J. P., Waverly.
Soden, F. B., Norwich.
Stuart, J. R., Ithaca.
Sturdevant, T. B., Elmira.
Suter, R. B., Elmira.
Tatlock, F. H., Oneonta.
Thompson, C. E., Oxford.
Turner, H. H., Marathon.
Vauderhoof, W. W., Watkins.
Waples, E. C., Elmira.
Wells, H. P., Hamilton.
West, J. B., Elmira.
Whitmarsh, H. D., Binghamton.
Wilbur, R. A., Elmira.
Willis, F. M., Ithaca.

HONORARY MEMBERS.

Burchill, J. E., Cortland.
Butler, A. S., Pasadena, Cal.
Flaherty, J. V., Chittenango.
Hall, W. H., Binghamton.
Harris, E. W., Pomona, Cal.
Hoysradt, G. W., Ithaca.
Kelley, W. H., Towanda, Pa.
King, H. B., Roxbury.
McCall, J. A., Buffalo.
Newell, J. K., Towanda.
Quintero, J. M., Lyons, France.
Rischell, E. C., Athens, Pa.
Smith, W. W., Montrose, Pa.
Spencer, C. W., Sidney.
Thompson, F. R., Homer.
Turner, A. D., Binghamton.
Watts, Willis E., Lyons, France.

LIFE MEMBER.

Darby, F. B., Elmira.

Seventh District.

THE annual meeting of the Seventh District Dental Society of the State of New York was held on April 7, 1917, and the following persons were elected officers for the ensuing year:

President—A. Osgood.
Vice-president—B. W. Palmer.
Recording Secretary—J. L. E. Banks.
Corresponding Sec'y—C. G. Morsheimer.
Treasurer—E. L. Schlottman.
State Dental Examiners—W. A. White (term to expire 1919) and J. E. Line (term to expire 1918).
Members of Executive Council—B. S. Hert (regular) and C. L. Brininstool (alternate).

The following were appointed to serve on State Society committees: J. F. McIntee (Law); E. G. Link (Legislative); A. W. Smith and W. W. Belcher (Oral Hygiene).

Two deaths occurred during the year—Rudolph H. Hofheinz and J. E. Sanford.

Respectfully submitted.

WIRT H. CONKLIN, *Corr. Sec'y.*

ACTIVE MEMBERS.

Agnew, F. L., 63 Monroe ave., Rochester.
Allen, D. H., Honeoye Falls.
Allen, H. W., 400 Cutler Bldg., Rochester.
Alvord, Charles L., 804 Professional Bldg., Rochester.
Avery, R. B., Auburn.
Bachman, C. C., Waterloo.
Banks, J. L. E., 407 Dake Bldg., Rochester.
Barr, W. H., 800 Main st., W., Rochester.
Barrett, W. R., Spencerport.
Beebee, J. H., 915 C. of C. Bldg., Rochester.
Belcher, H. L., Seneca Falls.
Belcher, W. W., 186 Alexander st., Rochester.
Bennett, C. A., 318 Powers Bldg., Rochester.
Bostwick, W. A., 133 Clinton ave., S., Rochester.
Bradley, M. C., 608 Granite Bldg., Rochester.
Brininstool, C. L., 1103 Granite Building, Rochester.
Brown, H. O., Waterloo.
Bryant, F. E., 309 Jefferson ave., Rochester.
Bryant, S. Roy, 309 Jefferson ave., Rochester.

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Buckland, C. F., Corning.
Burkhart, A. P., 52 Genesee st., Auburn.
Burkhart, G. A. P., Masonic Bldg., Auburn.
Burns, G. G., 47 Elwood Bldg., Rochester.
Carey, J. H., 115 Union st., N., Rochester.
Chase, C. D., 46 Webster ave., Rochester.
Clapp, E. A., Livonia.
Clark, B. F., 133 Clinton ave., S., Rochester.
Conklin, W. H., 624 Mercantile Building, Rochester.
Conyne, R. J., 1064 Main st., E., Rochester.
Cottrell, I. R., 707 E. & B. Bldg., Rochester.
Cowan, James W., Geneseo.
Crump, I. J., 20 Triangle Bldg., Rochester.
Cutler, G. H., Main st., Dansville.
Demerath, C. F., 511 E. & B. Bldg., Rochester.
Dengler, F. J., 214 Wilder st., Rochester.
Donoghue, Emma W., 46 Hickory st., Rochester.
Dunn, J. E., 884 Main st., W., Rochester.
Ebling, H. G., 35 Chestnut st., Rochester.
Eckler, H. F., 306 East Ave. Bldg., Rochester.
Foley, J. M., 346 Plymouth ave., Rochester.
Fowler, C. E., Wolcott.
Fraley, C. J., Geneseo.
Frank, H. L., E. Rochester.
Furner, J. S., Lima.
Gamble, W. D., Wayland.
Gilbert, L. H., 707 E. & B. Bldg., Rochester.
Gleason, D. F., Sheather st., Hammondsport.
Goble, L. S., 40 Triangle Bldg., Rochester.
Graves, J. W., 32 Triangle Bldg., Rochester.
Greene, F. A., Geneva.
Griswold, E. R., Dansville.
Griswold, V. H., 230 Mercantile Bldg., Rochester.
Hall, A., 43 Main st., Hornell.
Hammond, H. E. J., 14 William st., Auburn.
Hanna, J. N., 575 Main st., W., Rochester.
Hendrickson, F. E., 501 E. & B. Building, Rochester.
Hert, B. S., 713 C. of C. Bldg., Rochester.
Hettig, A. F., 227 Cutler Bldg., Rochester.
Hicks, B. G., Canandaigua.
Hill, J. O., 407 Dake Bldg., Rochester.
Holcomb, R. J., 422 Mercantile Bldg., Rochester.
Holmes, H. N., Canandaigua.
Horton, F. C., Clyde.
Horton, G. L., 12 William st., Auburn.
Horton, H. S., Avoca.
Howland, C. A., 901 C. of C. Bldg., Rochester.
Hughes, Wm., 119 Genesee st., Auburn.
Hulme, M. L., 75 S. Fitzhugh st., Rochester.
Inman, E. L., Clyde.
Ivory, F. W., 57 Triangle Bldg., Rochester.
Kohler, M. W., Fairport.
Kuhn, F. W., Dansville.
Lascell, E. R., 4321 Lake ave., Rochester.
Lewis, E. F., 508 E. & B. Bldg., Rochester.
Lewis, H. F., 513 C. of C. Bldg., Rochester.
Link, E. G., 226 Cutler Bldg., Rochester.
Locke, G. E., Brockport.
Lowe, G. C., 813 C. of C. Bldg., Rochester.
Lynch, C. G., 185 Park ave., Rochester.
McDermott, T. H., 216 Merriman st., Rochester.
McIntee, J. T., 248 Cutler Bldg., Rochester.
McMullen, M. F., 383 Main st., E., Rochester.
Marshall, H. E., Lyons.
Martin, J. F., Newark.
Marvin, G. P., 211 Cutler Bldg., Rochester.
Mattison, J. J., Canandaigua.
Meaker, S. R., Auburn.
Messerschmitt, F., 1023 Granite Building, Rochester.
Middaugh, J. E., 399 Seneca Parkway, Rochester.
Miles, E. B., 299 Central Park, Rochester.
Mills, R. Q., 257 Main st., E., Rochester.
Mitchell, H. W., 3 Lyell ave., Rochester.
Moll, C. F., 1 East ave., Rochester.
Morsheimer, C. G., 133 Clinton ave., S., Rochester.
Myers, W. A., 124 Genesee st., Auburn.
Nagel, Flora, 46 Hickory st., Rochester.
O'Neil, W. B., 747 Main st., W., Rochester.
Palmer, B. W., 232 University ave., Rochester.
Parish, W. A., Avon.
Parker, R. C., 1310 Dewey ave., Rochester.
Parmelee, J. H., 418 Mercantile Building, Rochester.
Pierce, C. J., 336 Mercantile Bldg., Rochester.
Povall, W. H., Mt. Morris.
Proseus, F. W., 528 Mercantile Building, Rochester.
Pulver, P. C., 525 Mercantile Bldg., Rochester.
Reeves, H. G., Fairport.
Reid, R. W., 448 Lyell ave., Rochester.
Requa, L., 307 Cutler Bldg., Rochester.
Rood, F. M., 700 E. & B. Bldg., Rochester.
Ross, E. G., 1226 Clinton ave., N., Rochester.
Sackett, W. C., 552 Genesee st., Rochester.

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Sager, A. E., 624 Mercantile Bldg., Rochester.
Saunders, B. G., 83 East ave., Rochester.
Schake, Sarah M., 711 C. of C. Bldg., Rochester.
Schlottman, E. L., 809 C. of C. Building, Rochester.
Scofield, J. A., Hilton.
Scott, J. J., 901 C. of C. Bldg., Rochester.
Sebold, F. C., Auburn.
Shaddock, F. J., 819 C. of C. Bldg., Rochester.
Sharp, E. T., Victor.
Showers, G. F., Corning.
Simmonds, C. S., 70 Genesee st., Auburn.
Smith, A. W., 33 Chestnut st., Rochester.
Smith, P. W., 913 C. of C. Bldg., Rochester.
Smith, W. W., 83 East ave., Rochester.
Stott, H. B., 433 Mercantile Bldg., Rochester.
Stryker, H. A., 317 Cutler Bldg., Rochester.
Sutherland, L. D., Canandaigua.
Sweet, E. J., 44 Main st., Hornell.
Tarrant, F. J., 837 Main st., W., Rochester.
Thorn, C. A., 702 Clinton ave., N., Rochester.
Tillotson, R. R., Lyons.
Vanderbelt, C. R., 412 Beckley Bldg., Rochester.
Waldron, C. R., 1129 Granite Bldg., Rochester.
Wallace, W. R. J., Canandaigua.
Welch, J. W., 40 West ave., Fairport.
Welcher, M., 707 E. & B. Bldg., Rochester.
Weller, J. L., Jr., 426 Mercantile Bldg., Rochester.
White, W. A., Phelps.
Whitney, G. W., 1041 Granite Bldg., Rochester.
Windell, W. A., 720 E. & B. Bldg., Rochester.

HONORARY MEMBERS.

Adams, D. F., Minnesota.
Goode, G., New York.
Howard, C. T., Rochester.
Jenkins, N. S., New Haven, Conn.
Miller, H. S., Rochester.
Nicholson, C. H., Ontario.
Smith, M. H., Colorado Springs.
Walters, J. S., Eugene, Ore.
Ward, C. H., Rochester.
Watson, G. H., Berlin.

LIFE MEMBERS.

Elmendorf, C., Penn Yan.
La Salle, B. F., Rochester.
Line, J. Ed., Rochester.
Miller, H. S., Rochester.
Osgood, A., Bath.
Smith, P. H., Rochester.

Eighth District.

THE annual meeting of the Eighth District Dental Society of the State of New York was held on April 10, 1917, and the following persons were elected officers for the ensuing year:

President—J. A. Sherwood.
Vice-president—L. L. Mulcahy.
Recording Secretary—W. R. Montgomery.
Corresponding Secretary—C. Pankow.
Treasurer—F. A. Ballachey.
Librarian—A. F. Isham.
Members of Executive Council—Abram Hoffman (regular), and M. Burton Eshleman (alternate).

The following were appointed to serve on State Society committees: L. Meisburger (Legislative); Walter H. Ellis and Irving E. Maul (Oral Hygiene).

During the year the society has held four regular meetings, October, December, February, and April; also two special meetings, one in conjunction with the Fifth, Sixth, and Seventh Districts in Buffalo in November, and the other in conjunction with the Buffalo Dental Association in January at the Hotel Lafayette, Buffalo.

The first regular meeting was held at the University Club building in this city, and the speaker for the evening was Dr. Robert

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Murray, who gave a *résumé* of the work done by the National Association at its recent meeting in Louisville, Ky. The second regular meeting was held at Hotel Statler, and the speaker for the evening was Dr. A. P. Sy, who spoke on "The Modern Theories of Diet." The third regular meeting was held at the Hotel Statler, and the essayist was Dr. C. K. Buell, whose subject was "Simple Removable Bridges According to the Chayes Method." The fourth regular meeting is the present one, and our essayist, Dr. Marshall Clinton, who will speak on "Oral Surgery, Comfort, and Cleanliness." Each and all of these meetings have been well attended, and the interest shown has been creditable.

The union meeting in conjunction with the Fifth, Sixth, and Seventh Districts was held at German American Hall, Buffalo, and was of the usual high caliber, and well attended by the several district members. Great interest was shown in the essays, clinics, and exhibits.

The special meeting in conjunction with the Buffalo Dental Association at the Hotel Lafayette in January was taken in charge this year by the Eighth District, and was the largest and most interesting special meeting of that character we have held. Speakers were Dr. Robert Murray, Mr. Roy Crandall, Mr. Fred Zander, and Mr. Guy B. Moore.

During the year the By-laws Committee with your help has revised and had printed the By-laws for this society, which you will shortly receive for your guidance.

The society has taken in fourteen members recommended by the Board of Censors, and five members have resigned, of whom two have been reinstated. We have no deaths to report for the year among our members.

Respectfully submitted,

J. A. SHERWOOD, *Rec. Sec'y.*

ACTIVE MEMBERS.

Allen, Chas. E., Brockton.
Anderson, Chas. E., Jamestown.
Backus, Herman W., 99 Elmwood ave., Buffalo.
Backus, W. M., 475 Grant st., Buffalo.
Baitz, Arthur G., 78 W. Oakwood Place, Buffalo.
Ballachey, F. A., 450 Elmwood ave., Buffalo.
Barclay, H. L., 174 E. Ferry st., Buffalo.
Bartlett, W. T., Castile.
Bates, O. W., 186 Seneca st., Buffalo.
Beach, J. W., 131 Allen st., Buffalo.
Beyer, F. A., 559 Main st., Buffalo.
Bissell, John E. N., Westfield.
Bode, Armin H., 370 Genesee st., Buffalo.
Boughton, W. E., Batavia.
Brown, Robt., 1865 Niagara st., Buffalo.
Buell, C. K., 131 Allen st., Buffalo.
Burkhart, H. J., Batavia.
Burley, W. J., Gowanda.
Burns, E. F., 1375 Main st., Buffalo.
Bush, Wm. W., Rushford.
Callahan, Leo D., 1115 Genesee st., Buffalo.
Camp, Paul Brown, 606-608 Chadakoin Bldg., Jamestown.
Carmichael, D. D., Leroy.
Caulkins, C. R., Perry.
Caulkins, R. W., Perry.
Cavers, W. W., 450 Elmwood ave., Buffalo.
Chester, H. M., 301 Linwood ave., Buffalo.
Childs, Lowell L., Springville.
Christenson, J. C., 106 Falls st., Niagara Falls.
Cleveland, Joseph L., 505 Franklin st., Buffalo.
Cogan, Maurice J., 359 Connecticut st., Buffalo.
Collins, J. P., 504 Brisbane Bldg., Buffalo.
Collins, John F., 580 Elmwood ave., Buffalo.
Conforto, Anthony D., 334 Terrace, Buffalo.
Consul, Arthur H., 404 Genesee st., Buffalo.
Coon, W. W., Alfred.
Cursons, Leon V., 331½ Franklin st., Buffalo.
Davis, Chas. H., 1425 Main st., Buffalo.
Dayment, Frank L., 184 Bloor st., Toronto, Canada.
Dewey, C. E., Batavia.
Dickson, John C., 863 Tonawanda st., Buffalo.
Dickson, W. B., 446 Genesee st., Buffalo.
Dillon, Chas. P., Batavia.
Diltz, David A., Warsaw.
Dixon, J. A., 917 Jefferson st., Buffalo.
Dollinger, Raphael H., Albion.
Doolittle, G. P., Albion.
Downes, C. R., 100 Main st., Lockport.
Dudley, John Lockhart, 722 Main st., Buffalo.
Duncan, J. C., 6 West ave., Lockport.
Early, S. J., Olean.

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Edgerly, S. C., 743 Fillmore ave., Buffalo.
Ellis, W. H., 397 Delaware ave., Buffalo.
Elwood, Grant, 55 Parker ave., Buffalo.
Ernsmere, J. B., 308 W. Ferry st., Buffalo.
Eschelman, S., 421 Franklin st., Buffalo.
Eshleman, M. Burton, 170 Hodge ave., Buffalo.
Farmer, E. J., 233 W. Ferry st., Buffalo.
Fay, M. L., 267 Elmwood ave., Buffalo.
Fish, J. B., 759 Tonawanda st., Buffalo.
Flagg, C. E., 158 Anderson Place, Buffalo.
Frey, Geo. J., 209 D. S. Morgan Bldg., Buffalo.
Froeber, Edward George, 462 E. Genesee st., Buffalo.
Garrett, F. S., 131 Allen st., Buffalo.
Garretson, J. L., 200 Hodge ave., Buffalo.
Geenen, G. J., 221 Hampshire st., Buffalo.
Gemmill, R. A., Lockport.
Gerstman, H. Viola, 755 Seneca st., Buffalo.
Gibbin, Floyd E., Springville.
Gibbs, A. B., Batavia.
Glazier, L. F., Springville.
Graf, E. G., 706 Michigan ave., Buffalo.
Graf, Katherine M., 252 Broadway, Buffalo.
Gregg, M. A., 103 Genesee st., Buffalo.
Greenfield, W. C., 169 Northland ave., Buffalo.
Hale, Chas. F., 303 Potomac ave., Buffalo.
Hall, Fred. J., 43 W. Tupper st., Buffalo.
Hammersmith, P. C., 25 Indian Church road, Buffalo.
Havens, F. C., Niagara Falls.
Heinrich, Albert, 541 Walden ave., Buffalo.
Hickelton, George Taylor, 322 Elk st., Buffalo.
Hicks, T. A., 55 Allen st., Buffalo.
Hill, Frank P., 731 Prospect ave., Buffalo.
Hoffman, Abram, 529 Franklin st., Buffalo.
Hollister, A. H., 13 E. Main st., Fredonia.
Hollway, Chas. Monreith, 2321 Main st., Buffalo.
House, C. W., Holland.
Howes, Louis C., 1370 Main st., Buffalo.
Hughey, G. M., 1355 Main st., Buffalo.
Hussong, Roger L., 112 Indian Church road, Buffalo.
Isham, A. F., 85 N. Pearl st., Buffalo.
Jackson, Graham E., 384 Franklin st., Buffalo.
Jackson, L. E., Franklinville.
Jones, O. E., Wellsville.
Jung, A. H., 64 Goodell st., Buffalo.
Jung, Elmer F., 607 Genesee st., Buffalo.
Jung, E. P., 584 Genesee st., Buffalo.
Kehr, G. B., 489 Grant st., Buffalo.
Keifer, Leo G., 700 Broadway, Buffalo.
Kendall, C. A., 241 Norwood ave., Buffalo.
Klipfel, Chas. M., 1350 Fillmore ave., Buffalo.
Lamb, John Richard, 144 Lovejoy st., Buffalo.
Lay, Victor, 891 Genesee st., Buffalo.
Leake, W. J., 53 Main st., Lockport.
Leitze, G. L., 1137 E. Genesee st., Buffalo.
Leland, Lloyd E., 1875 Niagara st., Buffalo.
Levy, Marvin, 1371 Main st., Buffalo.
Lorenz, Geo. W., 66 Goodell st., Buffalo.
Low, F. W., 52 N. Pearl st., Buffalo.
Lugsdin, F. G., 131 Allen st., Buffalo.
McCall, J. O., 131 Allen st., Buffalo.
McCarthy, A. J., 131 Allen st., Buffalo.
McCoy, D. H., 899 Main st., Buffalo.
McKee, Charles H., 410 N. Division st., Buffalo.
McMichael, H. R., 15 Oxford ave., Buffalo.
Madden, J. J., 49 Niagara st., Buffalo.
Main, D. T., 337 Niagara st., Buffalo.
Mair, C. R., 1157 Michigan ave., Buffalo.
Mallory, J. P., 463 W. Ferry st., Buffalo.
Maul, Irving E., 519 Main st., E., Batavia.
Maul, Willis R., 519 Main st., Batavia.
Meisburger, L., 85 N. Pearl st., Buffalo.
Merle, C. W., Batavia.
Middleton, C. O., 36 Young st., Tonawanda.
Mimmack, A. E., 795 Elmwood ave., Buffalo.
Montgomery, W. R., 505 Franklin st., Buffalo.
Morehouse, Clayton C., Kenmore.
Morgan, G. H., 2 N. Pearl st., Buffalo.
Mouthrop, G. F., 273 W. Ferry st., Buffalo.
Muir, Robert, 21 Main st., Gowanda.
Mulcahy, L. L., Batavia.
Murray, Robert, 761 Elmwood ave., Buffalo.
Newman, T. E., 546 Tonawanda st., Buffalo.
Noyes, W. P., Olean.
O'Shea, Thos. F., Leroy.
Packwood, E. S., 1370 Main st., Buffalo.
Pankow, C. A., 357 William st., Buffalo.
Pawlowski, Anthony L., 524 Amherst st., Buffalo.
Paxson, G. A., Hamburg.
Prefert, Alfred, 795 Genesee st., Buffalo.
Prentice, W. H., Crossett Block, Warsaw.
Preston, A. E., Delevan.
Prior, Ray Leon, 267 W. Utica st., Buffalo.
Pullen, H. A., 131 Allen st., Buffalo.
Raub, Herbert D., Olean.
Read, E. M., Perry.
Read, Harry S., Delevan.
Reynolds, H. E., 577 Broadway, Buffalo.
Roberts, J. G., 174 E. Ferry st., Buffalo.

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Robinson, L. W., 129 Elmwood ave., Buffalo.
Rose, Clifford E., 902 Electric Bldg., Buffalo.
Rozan, Geo. O., 1070 Broadway, Buffalo.
Ruszaj, S. E., 1012 Broadway, Buffalo.
Ryerse, O. G., 727 Seneca st., Buffalo.
Sandman, R. J., 24 Glendale Place, Buffalo.
Schnitzpahn, E. E., 18 St. John's Place, Buffalo.
Schwartz, Edward, 1234 Fillmore ave., Buffalo.
Sharp, C. H., 73 Main st., Lockport.
Sherwood, J. A., 283 Bryant st., Buffalo.
Shults, N. J., Batavia.
Simonds, G. H., 106 Pearl st., Medina.
Skinner, O. M., 968 Ridge road, Lackawanna.
Sortore, J. F., Belmont.
Spillman, Josephine H., 64 Webster st., North Tonawanda.
Squire, D. H., 37 Allen st., Buffalo.
Squires, L. A., 2337 Main st., Buffalo.
Stiker, A. G., Addison.
Storms, C. L., 131 Allen st., Buffalo.
Sugnet, E. L., 537 William st., Buffalo.
Tanner, H. F., Medina.
Tench, J. M., 1353 Jefferson st., Buffalo.
Tench, R. W., 220 42d st., W., New York.
Terry, I. L., 737 Seneca st., Buffalo.
Tesch, Frederick C., 69 Gluck Bldg., Niagara Falls.
Thompson, D. M., 311 Hartshorn Building, Niagara Falls.
Todd, E. L., Stearns Bldg., Dunkirk.
Underwood, F. H., 1063 Ellicott st., Buffalo.
Valente, Victor, 118 Seventh st., Buffalo.
Wardner, J. F., Lackawanna.
Warner, C. A., 39 S. Niagara st., Tonawanda.
Weaver, F. M., 6 West ave., Lockport.
Whipple, B. W., 301 Union st., Olean.
Whipple, E. O., 301 Union st., Olean.
Whipple, H. L., Cuba.
Wilmot, Max D., 37 Allen st., Buffalo.
Wolfsohn, Myron D., 165 William st., Buffalo.
Woodley, F. E., 123 Falls st., Niagara Falls.
Young, D. H., Attica.

HONORARY MEMBER.

Benjamin, H. L., 33 Center st., Batavia.

LIFE MEMBERS.

Butler, C. S., 733 W. Delavan ave., Buffalo.
Lewis, T. G., 587 Main st., Buffalo.
Snow, G. B., 231 Kennebec st., Long Beach, Cal.

Ninth District.

THE annual meeting of the Ninth District Dental Society of the State of New York was held on April 14, 1917, and the following persons were elected officers for the ensuing year:

President—D. W. McLean.
Vice-president—L. W. Helms.
Recording Secretary—A. P. Bedell.
Corresponding Secretary—George W. Morris.
Treasurer—Carl D. Gurnee.
Librarian—W. M. Fancher.
Members of Executive Council—A. W. Twiggar (regular); W. C. Fisher (alternate).

The following were appointed to serve on State Society committees: A. L. Granger (Legislative); Bertram Ball and G. H. Franzius (Oral Hygiene).

We have four applications for membership to be voted on at our fall meeting, as follows: Wm. O. Throop, Mount Vernon; Robert H. McLeod, New Rochelle; J. E. Hughes, Tarrytown, and Lester B. Dunning, Beacon.

Respectfully submitted,

CARL D. GURNEE, *Rec. Sec'y.*

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ACTIVE MEMBERS.

Allen, E. J., Port Chester.
Anderson, A. E., Peekskill.
Ashplant, P. R., Newburgh.
Ball, Bertram, Yonkers.
Bannan, P. C., Newburgh.
Barnum, H. L., Newburgh.
Bauder, P., Newburgh.
Bedell, Arthur Place, Mount Vernon.
Bedell, Walter H., Poughkeepsie.
Bennett, H. C., Newburgh.
Bevier, Monroe B., Poughkeepsie.
Bugdon, Frank C., New Rochelle.
Burr, J. C., Port Jervis.
Burr, Leroy E., Yonkers.
Carr, Lewis H., Newburgh.
Chatterton, J. W., Poughkeepsie.
Clark, Ralph L., Mount Vernon.
Cole, J. P., Dobbs Ferry.
Conover, C. A., Newburgh.
Darrow, H. N., Mount Vernon.
Davenport, W. F., Yonkers.
DeWitt, H. S., Middletown.
Downing, V. F., Poughkeepsie.
Dunning, W. O., Middletown.
Duryee, E. C., Peekskill.
Ehleider, T. J., Poughkeepsie.
Erman, E. P., Warwick.
Ernst, Otto, Larchmont.
Fancher, W. E., Yonkers.
Fancher, W. M., Ossining.
Fisher, Wm. C., Bronxville.
Frachtman, Philip, Suffern.
Franzius, G. H., Bronxville.
Granger, A. L., Mount Vernon.
Green, R. B., Tarrytown.
Gurnee, C. D., Beacon.
Hammond, G. A., Port Jervis.
Helms, L. W., Peekskill.
Hepworth, J. T., Wappingers Falls.
Johnson, J. H., Port Jervis.
Knapp, W. A., Millerton.
Lansing, C. T., Yonkers.
Longworth, Arthur W., Yonkers.
McLean, D. W., Mount Vernon.
McBrair, H. C., Middletown.
MacElroy, Marie F., Mount Vernon.
Mahoney, W. P., Millbrook.
Massoth, Harry P., New Rochelle.
Mills, J. J., Port Jervis.
Morris, Geo. W., Central Valley.
Morrow, Robert, Nyack.
Nichols, Guy L., Ossining.
Northrup, G. A., Poughkeepsie.
Page, M. S., Mount Vernon.
Palmer, Stephen, Poughkeepsie.
Parker, E. G., Goshen.
Patterson, J. E., Poughkeepsie.
Peterson, Leslie A., Croton-on-Hudson.
Phin, Albert E., Peekskill.
Randall, W. V., Newburgh.
Robinson, Chas. C., Beacon.
Rosen, Harry, Yonkers.
Roy, Chas. A., Mamaroneck.
Ryder, H. L. B., Poughkeepsie.
Segal, Peter, New Rochelle.
Schelpert, John W., Jr., Mount Vernon.
Sniffin, D. Austin, White Plains.
Southerland, J. R., Monroe.
Stanbrough, Wm. H., Newburgh.
Steurer, Wm. H., Mount Vernon.
Suffern, E. R., Suffern.
Swift, T. C., Mount Vernon.
Tice, C. H., Middletown.
Thompson, C. H., Goshen.
Traver, W. E., Red Hook.
Turner, C. G., Poughkeepsie.
Twiggar, A. W., Ossining.
Ulsaver, E. S., New Rochelle.
Vail, Clinton T., Yonkers.
Varcoe, E. R., Goshen.
Vernon, G. H., Middletown.
Weiss, Joseph, Ossining.
Writer, G. S., Nyack.
Wygant, G. P., Peekskill.

HONORARY MEMBER.

Hutchinson, R. G., Jr., New York City.

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President's Address.

By ROBERT MURRAY, D.D.S., Buffalo, N. Y.

To the Officers and Members of the Dental Society of the State of New York:

SECTION 31 of the By-laws of this society provides that the Executive Council at each annual meeting before adjournment shall name the next place of meeting.

In conformity with this by-law your Executive Council at the last annual meeting decided that the 1917 convention be held in the city of Buffalo.

Another important dental convention scheduled for western New York was the union meeting of the Fifth, Sixth, Seventh, and Eighth District societies, which was to have been held in this city last November, in connection with the proposed dedication of the Rochester Dental Dispensary.

It soon became apparent, however, that the dispensary could not be completed in time to hold the dedicatory services in the fall of 1916, so it was suggested that the union meeting of the districts be changed to Buffalo, and the state meeting to Rochester, thereby giving the dentists of the state an opportunity to be present at and participate in an event which I feel sure is destined to mark a new area in dental activities in western New York. The matter of the change of meeting-place was presented to the Executive Council of our State Society and the different executive bodies of the districts interested, and they, with almost unanimous consent, agreed to the change. This arrangement, however, presented legal technicalities which had to be considered, so it was decided upon legal advice to hold the first meeting of the Executive Council in Buffalo on the day previous to the opening of the general sessions, transact such business as is usually taken up at the opening session, and adjourn to meet in Rochester the following day.

In order to provide for any possible emergency in the future I would recommend that Sec. 31 of the By-laws be amended to read as follows:

> The society shall hold its annual meeting commencing on the second Thursday of May in each year at 10 A.M., and such other special meetings as may be necessary. The Executive Council shall name the next place of meeting.

It is with feelings of mingled satisfaction and appreciation that I welcome you to this, the forty-ninth annual meeting of the Dental Society of the State of New York—appreciation of the valuable services rendered this society by the

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efficient and able body of Rochester dentists, who have given unselfishly of their time and talents to the various duties assigned to them; and satisfaction at the thought that with their efficient support we have been enabled to present a program which I trust will meet the approval and commendation of the members of this society.

DEATH OF DR. R. H. HOFHEINZ.

While we rejoice at the prospect of a profitable and interesting meeting, yet there is sadness in the thought that in this his home city, where dental conventions seem incomplete without his genial presence, we miss the glad welcome, the warm handclasp, the wise counsel, and the loving fellowship of Rudolf Hofheinz.

In sacred memory he is with us today, and the inspiration of his life and his untiring labors in the interest of our beloved profession furnish us an example we do well to emulate.

> Lives of great men all remind us
> We can make our lives sublime,
> And departing leave behind us
> Footprints on the sands of time.

THE DISTRICT SOCIETIES.

It has been my privilege and pleasure during the past year to visit most of the district societies either in union convention assembled or individually, and while I have noticed a marked increase in dental activity throughout the state, yet the conditions to my mind have not reached that state of perfection which is so necessary and desirable in this day of large and ever-increasing opportunity.

We have practicing in New York State approximately 5500 dentists. Of this number we have upon the roster of the Dental Society of the State of New York about 1500 names; in other words, in this great Empire State, a name synonymous with twentieth-century attainments, three out of every four dentists have no interest in dental societies, are indifferent in their relation to those forces that count for progress and efficiency in dental science, and have not put their names on record as being interested in the solution of the many perplexing problems which we as a profession are endeavoring to solve.

Does this condition of affairs mean that the lofty tenets of our profession, for which our dental forefathers labored and fought so valiantly, are being sacrificed upon the altar of commercialism? Does it mean that a large majority of the profession are more interested in the financial side of dentistry than in their service to humanity?

This, to my mind, is one of the most serious problems which we, as a society, have to face, for there never was a time in the history of dentistry when the door of opportunity was so wide open, when the Macedonian call was so insistent, when the spirit of co-operation between the medical and dental professions was so cordial as it is today.

Never before in the history of our profession has the importance of our work more impressed the public, and enlisted the sympathy and co-operation of those forces that have enabled us to enter larger fields of usefulness, than at the present moment. How important it is, then, that we as a profession should present a united front in this great warfare against dental disease.

We are rapidly taking our place among the learned professions—are no longer looked upon as mere mechanics, but have

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earned the right of recognition as an important branch of the healing art.

A noted educator has said that the test of education is measured by the degree in which we are related to the great problems that are of communal interest. In this great democracy, where compulsory educational laws adorn our statute-books, we are encouraged by the manner in which the great forces of education and learning are leaving their imprint upon the life of the community. Fifty years ago, and even less, the care of the unfortunate and needy was left to the church and the charitably inclined. No efficiently organized system of relief existed: disease and poverty, except in a few isolated communities, were dealt with in a perfunctory and haphazard manner; but today we have come to realize that the individual unit of society is a community asset, the efficiency of which depends upon a sound mind in a sound body.

To maintain this desirable equilibrium science and art and all those forces which count for the uplift of humanity have been called upon, and are unselfishly contributing their share toward creating and maintaining efficiency standards.

Art is contributing her share in the free exhibition of the works of the great masters, and in encouraging the study of the beautiful and sublime in nature.

Music is contributing her quota toward the moral and spiritual uplift of the community by the introduction of the free public concert and the community chorus.

The historical societies and kindred institutions throughout the land are fanning the flames of patriotism and devotion in the hearts of a people who, though of various nationalities, are banded together by a tie of democracy that is embodied in our free institutions.

The health of the community is safeguarded by our efficient boards of health, our pure food laws, public playgrounds, public baths, and child clinics, where the unenlightened parent is taught the proper care and feeding of the infant committed to her care.

Medicine is contributing her share in developing and maintaining body efficiency in the free public clinic and in the campaign of public instruction upon those subjects which are of vital interest to the health and happiness of the community.

In view of the unselfish devotion to the cause of humanity above recounted, is it any wonder that dentistry during the last fifteen years has awakened to a sense of her obligation and the part that she is to take in the great work of community services?

That she has made good is too apparent to require extended discussion, as the evidences of the progress she has made in her own particular department of social service are about us on every hand. That the public at large has been impressed with the importance of our work is emphasized by the fact that dental defects are a barrier to the entrance upon not only the ordinary vocations of life, but also to the service of one's country in any great national crisis. About us on every hand we find communities and individuals who by their active cooperation and financial assistance have made it possible for our profession to enter new and larger fields, and serve humanity more efficiently than in the past.

SCIENTIFIC RESEARCH.

At no time in the history of dentistry has there been such concerted action in

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an endeavor to solve some of the intricate problems that confront us as a profession. Never before has such interest been aroused in the prosecution of scientific investigation, not only in the National and state societies, but in various local centers, where, under the direction of men whose minds are aflame with devotion to scientific progress and love for their profession, endeavors are being made to answer some of the perplexing questions asked by the medical profession and the laity.

At the 1916 meeting of the National Dental Association held in Louisville the House of Delegates adopted the recommendations of the Board of Trustees by a unanimous vote. These included making membership in the National Dental Association contingent upon the financial support of the Research Department by an increase of $1 in dues; this amendment, in accordance with the constitution, has to lie over for one year.

Dr. Price, in writing me under date of March 20th, informed me that trustees of the Research Institute, the officers and trustees of the National Dental Association, and the members of the Research Commission met in joint session in Cleveland on March 10th to consider recommendations made by the Carnegie Foundation, and to study means for the best possible development of the Research department.

At the above meeting the following resolution was unanimously adopted:

RESOLVED, That it be recommended to the various state societies that their dues be increased one dollar per member for the support of the Research Institute, which amount shall be paid directly to the treasurer of the National Research Institute; that we further recommend, in those states where the dues have been raised for this purpose, that the treasurer or secretary of each state be requested to forward all research funds raised for this purpose directly to the treasurer of the Research Institute.

I am not unmindful of the fact that honest criticism has been aroused, and the question has often been asked whether the results so far obtained have warranted the expenditure of so large a sum of money in this particular department of dental society work. In rebuttal it is only necessary for us to turn back the pages of dental history and review the evidence therein contained.

Who of us is qualified to depict the probable status of dentistry today if such men as Black, Miller, Jenkins, Brophy, Truman, Talbot, Taggart, and a host of others whom I might name had not lived and labored among us? The investigations of the most of these men have been placed as a free-will offering upon the altar of dentistry, and posterity has incurred a debt which it will never be able to liquidate.

We have reached a stage in our professional development where we should be able to stand alone.

The time has come when this important work should be undertaken by the profession as a whole, and not depend upon gratuitous contributions to dental science by men who, after the arduous and exacting duties of everyday practice, are content to burn the midnight oil in order to solve some of our problems. Professional self-respect can only be maintained by every man doing his share, and this can only be accomplished by the equitable distribution of the burden over the entire profession as outlined by the Research Commission. I would therefore respectfully recommend that our State Society pledge not only its financial but its moral support to this important movement to which our representatives

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in the National Association have subscribed.

THE NEW DENTAL LAW.

New York State is to be congratulated upon having on its statute-books a new dental law which, according to competent critics, is a model of its kind, and far surpasses any dental legislation that has ever been enacted in this or any other country.

That it may have certain defects no one will deny, but as time progresses and these defects become more apparent, it is only reasonable to suppose that proper steps will be taken by legislative enactment to so amend the law that the interests of the public will be best served, and the honor and integrity of the profession jealously safeguarded.

The harmonious working of any legal machinery can only be accomplished after due trial, so that it is absolutely necessary that patience and sound judgment should prevail, in order that conditions as they present may be efficiently dealt with, to the end that harmony between the profession and the legal authorities may be maintained.

Already many instances of the automatic working of the law have been noted, and this without any legal pressure being brought to bear upon the offending individuals. That many glaring examples of illegal practice still remain is not denied, but as the forces behind the law become thoroughly organized, it is only reasonable to suppose that these offenders will be summarily dealt with.

To this end the department at Albany needs the active co-operation and assistance of every ethical dentist in the state in order that the law may be rigidly enforced throughout the entire jurisdiction of the State Society.

Considerable adverse criticism has been leveled at some of the provisions of the law, particularly that clause relating to annual registration. To my mind this is one of the most important provisions, and one that is calculated to do more toward the apprehension and conviction of illegal practitioners than any other law that has ever been enacted. By this provision the legal process is very much simplified, as it eliminates the necessity of procuring evidence in the case of any individual not legally registered.

THE DENTAL HYGIENIST.

Another section of the law that has received considerable adverse criticism is that clause creating the dental hygienist, many claiming that danger of illegal practice from this source will constitute a menace to the profession.

I am of the opinion that these fears are more imaginary than real, as no such abuses exist in the medical profession from the licensing of medical nurses, but, on the contrary, their services are considered a necessary adjunct in the successful and efficient treatment of disease. The oral hygiene campaign which has swept across this continent during the last few years has created a demand for this class of skilled service which can only be met by a properly trained assistant, and I predict that the time is not far distant when the up-to-date office will have upon its staff a skilled dental hygienist.

The law regulating this particular branch of service is sufficiently explicit and drastic to deter any individual from violating any of its provisions.

THE FOUR-YEAR DENTAL COURSE.

There is no branch of scientific teaching or training that has made more rapid

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and substantial progress during the last half century than dentistry.

When we consider that fifty years ago there was practically no dental literature, when we had but two dental schools in the country, with an eight months' course of instruction covering a period of two years, when preliminary educational requirements were not deemed necessary, when it was considered a better qualification to graduate from a reputable dental office than from a dental school, when more importance was placed on the practical than on the scientific side of dentistry—these facts, when viewed in the light of present standards, furnish us an adequate idea of the substantial progress that has been made in dental science.

The year 1917 is destined to mark a new era in dental teaching in our country. Beginning September 1917 there is to be inaugurated in the principal dental schools throughout the country a four-year course of instruction, with preliminary educational requirements which shall guarantee to the profession a class of men of superior mental equipment and training, whose influence upon the profession is bound to be of inestimable value in raising the standard of dentistry in this country.

In this connection it seems appropriate to mention the good work which has been accomplished by the Dental Educational Council of America in the inspection and proposed classification of all the dental schools in the country, and in the recommendation of the committee on curriculum in relation to the four-year course.

The classification of dental colleges, to my mind, will not only do more toward attaining proper educational standards in various institutions of learning, but will hasten the day when the interchange of licenses between the various states will become an assured fact.

INDEPENDENT JOURNALISM.

This is a question of vital interest to the profession, and one that is destined to occupy an important position in dental society deliberations in the immediate future. I am of the opinion that the time is about ripe for organized dentistry to take a decided stand on all questions that have a bearing on professional standards. The time has arrived when the line of demarcation between professionalism and commercialism should be clear-cut and well defined.

This is not a mere question of sentiment, nor should it be an occasion for acrimonious discussion, but rather furnish an opportunity for calm deliberation on a subject that affects the very foundation of our calling.

Professionalism and commercialism are both legitimate, and each in its own particular field has a definite service to render, but the characters of those services are so incompatible with each other that any alliance between the two not only has a demoralizing effect, but lowers their standard of efficiency.

FIFTIETH ANNIVERSARY MEETING.

The year 1918 will mark the fiftieth milestone of dental progress in this state. No meeting in the history of the Dental Society of the State of New York will compare in interest and importance with that to be held in New York City next year—a meeting in which will be epitomized the results of the last half-century of progress and achievement in the dental art.

No branch of medicine can compare in

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degree and scope along lines of constructive progress in scientific investigation and preventive measures with dentistry.

We are fortunate in having with us men who have contributed much toward the elevation of dentistry to that high plane of professional achievement which we now enjoy, and no more fitting climax to a half-century's service to dentistry and humanity could be devised than that these men, who have contributed so much to dental history, should be honored in some conspicuous manner as seems best in the minds of the officers of the society in 1918.

It was my privilege, during the past year, to attend a testimonial banquet in New York City in honor of one of our charter members, who for thirty-three years had faithfully served our society as chairman of the Law Committee.

That he performed faithfully and well and with an eye single to the best interests of our society the arduous duties of his office is evidenced by the fact that there were present on that occasion over two hundred dentists from all parts of the country, who esteemed it a privilege to be present and assist in doing honor to Dr. Carr, who has served his profession so loyally.

ORAL HYGIENE.

The widespread interest in this subject that has been aroused in the minds of the laity is due in a great measure to the oral hygiene propaganda which has swept the country of late years.

This department of our society's activities should receive an ever-increasing amount of attention, for there is no more important field of usefulness than that which has to do with the dissemination of knowledge having such an important bearing on the health of the community.

The fruits that have attended our labors in the past are too apparent to require extended discussion.

The dedicatory exercises of the Eastman Infirmary in which we have just participated is but another evidence of the important position that dentistry occupies in community service. One of the encouraging signs of the times is the interest manifested in various centers by philanthropists who by their generous donations have made it possible for the dental profession to enter larger fields of public service, and Rochester is indeed to be congratulated that she has in her midst a man who has put such a tangible stamp of approval upon the great work you are endeavoring to do in this community. The dental profession owes these men a debt of gratitude that we shall never be able to pay.

Our State Society is to be congratulated that one of our members has measured up to the exacting standard needed to direct this important branch of public service, and I feel confident that I re-echo the sentiment of every member of this society when I wish Dr. Harvey J. Burkhart every success in the administration of this philanthropic enterprise.

LIABILITY INSURANCE.

In a paper entitled "The New Era in Dentistry: Its Relation to the Increase in Malpractice Suits," read before the First District Society on Dec. 4, 1916, by Bissell B. Palmer, Jr., and published in full in the *Journal of the Allied Dental Societies,* March 1917, the essayist presented in forceful argument the grave danger that menaces our profession as a result of recent scientific investigations, aided by the disclosures of the X-ray.

The essayist in his remarks stated that

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he had approached the chief lawyer of one of the liability insurance companies, with the thought in mind that he, if anyone, could tell him the real situation. He replied that lawsuits against dentists for malpractice had increased shockingly, and were becoming more frequent every day. Statements and statistics since received from four of the largest insurance companies indicate positively that these malpractice suits have doubled in number during the past three years, and are increasing more rapidly at the present time.

Owing to this condition, we are informed, one principal insurance company is desirous of binding the other companies to an agreement for a standard premium of twenty-five dollars for dentists' liability insurance.

The Executive Council of the State Dental Society at its 1916 meeting in Albany, after studying every phase of the liability insurance proposition, recommended that the United States Fidelity and Guaranty Co. of Baltimore, Md., be designated as the company in which to insure under a group policy any member of the State Dental Society desiring such protection. This company has $10,000,000 assets. It agrees to insure the members of this society for an annual premium of ten dollars, and undertakes to pay any judgment up to $5000 in each single case, with a limit of $15,000 for each individual member of one group for any one policy year.

This attractive proposition is worthy of the thoughtful consideration of this body. Any further information on this subject may be had from Dr. James W. Canaday, who has been appointed trustee of the policy, and from whom application blanks can be secured.

DENTISTRY IN THE WAR.

The terrible death struggle now going on in the European nations has furnished an opportunity of demonstrating to the world the importance of the great work in which we, as a branch of the healing art, are engaged. The terrible head wounds produced in the prosecution of modern trench warfare have given the oral surgeon an opportunity, with the co-operation of the general surgeon, of securing results in badly mutilated cases that seem almost incredible.

The manner in which the American Dental Corps has risen to the opportunity has excited the wonder and admiration of the entire world, and has done more than any one thing in the last fifty years to place dentistry on the high pedestal of public approbation it now occupies.

One of the beneficial results of this awful war has been to stimulate investigation and study in oral surgery throughout the world, and its far-reaching effects will be manifested long after this struggle is at an end; and if our Preparedness League of American Dentists accomplishes no more than the inauguration of study clubs in connection with their local units for the purpose of scientific investigation along the lines indicated, its labors will not have been in vain.

STANDARDIZATION.

Those of you who have observed the signs of the times in our particular field of human endeavor will have noticed the strong effort that is being made by our foremost thinkers and investigators to eliminate the haphazard and empirical methods that have characterized our

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operations in the past, and to introduce methods that have been reduced to exact scientific standards.

The work of the Scientific Research Commission of the National Dental Association and its affiliated bodies in the various state societies, together with the work that is being carried on by various study clubs throughout the country, is deserving of our hearty commendation and support, and it is to be hoped that the interest that has been aroused will be fostered and maintained, to the end that the great work we have undertaken will be carried on to a successful conclusion.

STATE SOCIETY TRANSACTIONS.

At the 1916 meeting in Albany I directed the attention of the Executive Council to the fact that the Dental Society of the State of New York had not a complete set of its printed Transactions in its possession. This, to my mind, was unfortunate, as they contain a complete record of the birth and progress of our profession in this state. Your Executive Council on motion appointed Dr. Hert and myself a committee with power to procure for the State Society a complete set of its proceedings. We are pleased to report that, through the generosity of Dr. Charles S. Butler, for many years actively associated with this society in various official capacities, we are able to present to this society a complete set of its own Transactions.

I would respectfully recommend that this society tender Dr. Butler, through its secretary, its sincere thanks for this valuable gift.

I would also recommend that these volumes be placed in the State Library at Albany, in order that the members of this society may use them as a reference when desired.

I would further recommend that a committee of one be appointed from the Third district, whose duty it shall be to have subsequent numbers of the State Society Transactions bound in suitable form and deposited in the State Library at Albany, in order that the records of this society may be maintained in complete form.

In conclusion, I wish to thank those who have contributed to the success of this meeting. The unselfish interest manifested by the profession, especially the men of Rochester and particularly Dr. Link, in assuming the burden of organizing and arranging this meeting, has contributed in no small degree to the success of the forty-ninth annual meeting of the Dental Society of the State of New York.

To the essayists and clinicians, espeially those from other states, who have contributed to the success of this meeting, I wish to tender the sincere thanks of our society. This sacrifice of time and money in the interest of the profession is one of the encouraging signs of the times, and speaks volumes for the success of our great work in behalf of suffering humanity.

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Report of the Correspondent.

By L. M. WAUGH, D.D.S., New York.

Radiology as an Adjunct in the Practice of Dentistry.

YOUR Correspondent, with the approval of some of the officers of the society, selected "Radiology as an Adjunct in the Practice of Dentistry" as the topic for the report of this year. This decision was reached because of the conviction that the great majority of the profession are, as yet, employing radiographs but sparingly, and that only a comparative few are installing equipments and availing themselves of the aid and giving their patients the benefit to be derived from the *unrestricted* use of radiographs as a guide in daily practice. For the purpose of obtaining a representative expression of opinion from dentists who have been doing their own radiodontia, six of the largest manufacturers of apparatus specially designed for this work were asked for a partial list of those who had purchased outfits from them. All responded, the lists including practitioners in nearly all parts of the United States and three provinces of Canada. Two hundred and twenty-five names were selected from these lists, and in addition the names of one hundred leading practitioners, regardless of their attitude toward radiology, were added. This embraced three hundred and twenty-five dentists, to each of whom the following circular letter and list of questions were sent:

My dear Doctor,—You have been selected by the Correspondent of the Dental Society of the State of New York as one from whom it is desirable to obtain an expression of opinion for the report of this year.

The response to the list of questions sent for the previous two reports was most gratifying. Last year, answers were received from 153 dentists, practicing in twenty-four states and in four provinces of Canada, and included answers from teachers in forty-four dental schools and sixty-five from practitioners not associated with dental faculties.

Some of the officers approved the topic "Radiology as an Adjunct in the Practice of Dentistry," therefore the following list of questions is sent you. Your answers, tabulated with those of others, will greatly aid the Correspondent in his effort to convince the great number of our profession who do not as yet realize it that *the unrestricted use of radiographs* is essential to honest dentistry.

Rest assured of the appreciation of the society and of the personal gratitude of the Correspondent.

Sincerely yours,

L. M. WAUGH, *Correspondent.*

QUESTIONS.

(1) *A.* Do you consider radiographs as being essential to best practice—taking dentistry as a whole?

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B. Do you find that quite a number of a single case are often necessary, both for diagnosis and as a guide during the progress of treatment?

C. In the light of your present knowledge of their value, would you feel that you could be honest to yourself or your patient, without the use of radiographs?

(2) Do you regard in the technique of making radiographs that—

A. It is so simple that any practitioner may easily master it?

B. It may be done in practically any dental operating room without disarrangement of ordinary standard equipment?

C. The time required is so short as not to interfere materially with regular operative procedures?

D. All parts of the work, except placing the tube and film, can be done equally well by any average assistant?

E. A special knowledge of photographic procedures is unnecessary?

F. The health of neither operator nor patient is endangered by the use of modern apparatus?

(3) Have you reached the conclusion that—

A. The dental practitioner can make radiographs that best meet his needs, because of his intimate knowledge of individual conditions and of the requirements of the case in hand?

B. Because of this knowledge he knows from what angle the exposure can best be made?

C. A knowledge of the clinical history is essential to the intelligent interpretation of a radiograph?

D. The principles of interpretation, as understood up to the present, are not difficult of comprehension?

(4) In pulp cavity treatment—

A. Do you consider it necessary to radiograph every case?

B. Do you sometimes find conditions of a physical nature—as malformed or excessively tortuous roots, etc.—that make treatment inadvisable?

C. What is the minimum number of radiographs that should be made of each case?

D. At what stages of treatment should these be made?

E. What is the maximum number you have made of a single case?

F. Do you consider it necessary to make radiographs in doubtful cases at intervals after the canals appear to have been well filled?

G. What is the average interval between radiographs made for this post-operative observation?

(5) *A.* Do you make a separate charge for each radiograph?

B. If so, does the patient not sometimes question the need for several of a given case?

C. If not in your own practice, do you believe that this would be so in the great majority of practices?

D. Would this not be overcome by having it understood that the necessary radiographs are a part of the service, and as such are not charged for separately, but are included in the general fee?

E. Do you find that the time saved by radiodontic findings largely compensates for the time required in making them?

Answers to the questions were received from 192 dentists, practicing in twenty-seven states and in three provinces of Canada.

The answers were carefully tabulated and constitute the summary from which the conclusions in this report were drawn. The answers from those who have installed apparatus and have been making their own radiographs are so invariably in the affirmative that to quote from the numerous comments would seem superfluous and serve only to unnecessarily lengthen the report. It is notable that of those who have installed and use radiodontic equipment, *there is not one dentist who expressed disappointment or mentioned a preference for again having the work done outside his office.*

Summary of Answers, with Conclusions.

Question 1.

(*A.*) *Do you consider radiographs as being essential to best practice—taking dentistry as a whole?*

"Yes," answered by 189. Answer evaded by 3.

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(*B.*) *Do you find that quite a number of a single case are often necessary, both for diagnosis and as a guide during the progress of treatment?*

"Yes," answered by 176. "Once in a while," answered by 4. "No," answered by 7. Answer evaded by 5.

(*C.*) *In the light of your present knowledge of their value, would you feel that you could be honest to yourself or your patient without the use of radiographs?*

"No; could not be honest," answered by 181. "Yes," answered by 4. Answer evaded by 7.

Conclusion: In the light of present knowledge, the *unrestricted* use of radiographs is essential to honest dentistry.

Question 2.

Do you regard in the technique of making radiographs that—

(*A.*) *It is so simple that any practitioner may easily master it?*

"Yes," answered by 157. "No," answered by 25. Answer evaded by 10.

(*B.*) *It may be done in practically any dental operating room without disarrangement of ordinary standard equipment?*

"Yes," answered by 165. "No," answered by 18. "Possibly," answered by 1. Answer evaded by 8.

(*C.*) *The time required is so short as not to interfere materially with regular operative procedure?*

"Yes," answered by 159. "No," answered by 21. Answer evaded by 12.

(*D.*) *All parts of the work, except placing the tube and film, can be done equally well by any average assistant?*

"Yes," answered by 164. "No," answered by 19. Answer evaded by 9.

(*E.*) *A special knowledge of photographic procedures is unnecessary?*

"Yes, unnecessary," answered by 116. "No—is necessary," answered by 64. Answer evaded by 12.

(*F.*) *The health of neither operator nor patient is endangered by the use of modern apparatus?*

"Yes—health not endangered," answered by 174. "Doubtful," answered by 1. Answer evaded by 17.

Conclusion: That efficient and safe radiodontic equipment is now so compact and the technique so simplified that any dentist may, with but little special preparation, make satisfactory radiographic exposures in the dental chair regularly used in his operating room.

Question 3.

Have you reached the conclusion that—

(*A.*) *The dental practitioner can make radiographs that best meet his needs, because of his intimate knowledge of individual conditions and of the requirements of the case in hand?*

"Yes," answered by 169. "Possibly," answered by 6. "No," answered by 9. Answer evaded by 8.

(*B.*) *Because of this knowledge, he knows from what angle the exposure can best be made?*

"Yes," answered by 171. "Possibly," answered by 3. "No," answered by 3. Answer evaded by 16.

(*C.*) *A knowledge of the clinical history is essential to the intelligent interpretation of a radiograph?*

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"Yes," answered by 177. "Undoubtedly," answered by 1. "No," answered by 4. Answer evaded by 10.

(*D.*) *The* PRINCIPLES *of interpretation, as understood up to the present, are not difficult of comprehension?*

"No, not difficult," answered by 110. "Yes, difficult," answered by 62. "Usually," answered by 1. Answer evaded by 19.

Conclusions: (*a*) That radiographs best meeting the needs of a given case can be made by the dentist treating that case, because of his intimate knowledge of conditions and requirements. (*b*) That the *principles* of interpretation are not difficult to understand, and that correct decision in a majority of cases depends largely on an intimate knowledge of the clinical history, which can best be known to the dentist treating the case; therefore he is in possession of the knowledge essential to the most intelligent diagnosis.

Question 4.

In pulp cavity treatment—

(*A.*) *Do you consider it necessary to radiograph every case?*

"Yes," answered by 99. "Some exceptions," answered by 7. "No," answered by 67. Answer evaded by 19.

(*B.*) *Do you sometimes find conditions of a physical nature, as malformed or excessively tortuous roots, etc., that make treatment inadvisable?*

"Yes," answered by 162. "Rarely," answered by 5. "No," answered by 6. Answer evaded by 19.

(*C.*) *What is the minimum number of radiographs that should be made of each case?*

"Three," answered by 53. "Two," answered by 70. "Four," answered by 4. "One," answered by 19. "Depends on condition," answered by 17. "Several," answered by 1. Answer evaded by 28.

(*D.*) *At what stages of treatment should these be made?*

"Before, during, and after treatment," answered by 76. "Start and finish," answered by 50. "When root-filling is complete," answered by 11. "Beginning," answered by 7. "Whenever there is a doubt," answered by 7. Answer evaded by 41.

(*E.*) *What is the maximum number you have made of a single case?*

"Forty," answered by 1. "Thirty," answered by 2. "Fifteen to twenty," answered by 2. "Twelve," answered by 5. "Ten," answered by 14. "Eight," answered by 11. "Seven," answered by 15. "Six," answered by 32. "Five," answered by 24. "Four," answered by 22. "Three," answered by 8. "Two," answered by 2. Answer evaded by 55.

(*F.*) *Do you consider it necessary to make radiographs in doubtful cases at intervals, after the canals appear to have been well filled?*

"Yes," answered by 139. "Sometimes," answered by 21. "No," answered by 15. Answer evaded by 24.

(*G.*) *What is the average interval between radiographs made for this post-operative observation?*

"One to two days," answered by 1. "Two weeks," answered by 2. "One month," answered by 16. "Two months," answered by 17. "Three months," answered by 30. "Four months," answered by 5. "Six months," answered by 47. "One in four months and another in a

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year," answered by 5. "Nine months," answered by 4. "One year," answered by 4. "Depends on condition," answered by 8. Answer evaded by 55.

Conclusions: (*a*) That in pulp cavity treatment a minimum of three radiographs should be made. The first, before beginning treatment, as means of diagnosis; the second, showing wires placed fully to the end of each root; the third, showing the filling material properly placed. Many intervening radiographs are often necessary. (*b*) That radiographs made at intervals of from two weeks to several months are frequently necessary for post-operative observation of doubtful cases. As the years pass they should also be made whenever local or systemic symptoms arise.

Question 5.

(*A.*) *Do you make a separate charge for each radiograph?*

"No," answered by 62. "Yes," answered by 87. "Sometimes," answered by 17. "Depends," answered by 6. Answer evaded by 20.

(*B.*) *If so, does the patient not sometimes question the need for several of a given case?*

"Yes," answered by 74. "Not often," answered by 15. "No," answered by 34. Answer evaded by 69.

(*C.*) *If not in your own practice, do you believe that this would be so in the great majority of practices?*

"Yes," answered by 116. "Possibly," answered by 10. "No," answered by 28. Answer evaded by 38.

(*D.*) *Would this not be overcome by having it understood that the necessary radiographs are a part of the service, and as such are not charged for separately, but are included in the general fee?*

"Yes," answered by 147. "Perhaps," answered by 8. "No," answered by 8. Answer evaded by 29.

(*E.*) *Do you find that the time saved by radiodontic findings largely compensates for the time required in making them?*

"Yes," answered by 162. "Occasionally," answered by 2. "No," answered by 8. Answer evaded by 20.

Conclusions: That it is consistent with professional dignity and conducive to greater efficiency to include the necessary radiographs as a part of dental service.

SUMMARY OF CONCLUSIONS.

(1) In the light of present knowledge, the *unrestricted* use of radiographs is essential to honest dentistry.

(2) That efficient and safe radiodontic equipment is now so compact and the technique so simplified that any dentist may, with but little special preparation, make satisfactory radiographic exposures in the dental chair regularly used in his operating room.

(3) (*a*) That radiographs best meeting the needs of a given case can be made by the dentist treating that case, because of his intimate knowledge of conditions and requirements. (*b*) That the *principles* of interpretation are not difficult to understand, and that correct decision in a majority of cases depends largely on an intimate knowledge of the clinical history, which can best be known to the dentist treating the case; therefore he is in possession of the knowledge

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essential to the most intelligent diagnosis.

(4) (*a*) That in pulp cavity treatment a minimum of three radiographs should be made. The first, before beginning treatment, as means of diagnosis; the second, showing wires placed fully to the end of each root; the third, showing the filling material properly placed. Many intervening radiographs are often necessary. (*b*) That radiographs made at intervals of from two weeks to several months are frequently necessary for post-operative observation of doubtful cases. As the years pass they should also be made whenever local or systemic symptoms arise.

(5) That it is consistent with professional dignity and conducive to greater efficiency to include the necessary radiographs as a part of dental service.

Your Correspondent desires, in the name of the society, to express gratitude to all those who so kindly contributed to this report. It is earnestly hoped that it will be the means of inducing very many more dentists to do their own radiodontia.

Respectfully submitted,

L. M. Waugh, *Correspondent.*

DISCUSSION.

Dr. Charles F. Ash, New York City. There seems to be no loophole for anybody to crawl through in evading the responsibility of the radiographic outfit, after the mass of evidence in its favor placed before the profession. It is only a question as to how and when it should be used, in my opinion, and the question as to its desirability is not open for discussion.

"Do you consider radiographs as being essential to best practice—taking dentistry as a whole?" I do not think *that* question is open for discussion. My answer is also absolutely "Yes" to the next question—"Do you find that quite a number of a single case are often necessary, both for diagnosis and as a guide during the progress of treatment?"

The next question is, "In the light of your present knowledge of their value, would you feel that you could be honest to yourself or your patient without the use of radiographs?" I wonder how many men not using the radiograph in their offices put that question to themselves daily. I suppose every time a man fills a root he wonders whether it is filled to the end. It is not possible for a man to give honest work to his patients without checking it up by the aid of the radiograph. We know that many practitioners have used the same technique more or less that we do now, and in spite of their knowledge of technique and their carefulness they frequently failed to perform a satisfactory operation. If that was true then, it is just as true now.

"Do you regard the technique as so simple that any practitioner may easily master it?" An office girl can be taught to do a large part of the dental technique.

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The Correspondent then asks, "Do you think it may be established in any dental office, and that it does not interfere with the ordinary dental procedure?" That cannot be answered in the affirmative in all cases. It does interfere, but I do not like the word "interfere," because it is part of the necessary operation, and I do not consider it an interference to do any part of the work that is necessary as a step toward the finished operation. I think the time taken is fully compensated for by the results.

"Do you think that all parts of the work, except placing the tube and film, can be done equally well by any average assistant?" With the modern equipment, which makes it possible for us to determine the exact amount of ampèrage and milliampèrage, and the exact amount of spark gap in penetration, it is possible for any assistant to make the exposure in a given time. There is a large responsibility on the shoulders of the dentist in being sure that his apparatus is in proper condition every time before the exposure is made.

"Do you think that a special knowledge of photographic procedures is necessary?" Anybody can learn to take a picture with the radiographic apparatus, bearing in mind that the responsibility is upon the dentist to see that his apparatus is in proper condition before the picture is taken.

"Do you think that the health of operator and patient is endangered by the use of the modern apparatus?" In view of the fact that some people have met with accidents, and that unfortunate occurrences have taken place in the offices of men who have been well equipped with a knowledge of the X-ray apparatus, I think it behooves everyone to take every possible precaution against accident. I do not believe it is well to regard too lightly the question of there being absolutely no danger in these things. It is true that a man may make radiographs day after day and have no trouble; but cases do occur where there are X-ray burns, and because there *can* be trouble it is the duty of the dentist to take every possible precaution.

There is one thing to which not much attention has been paid, but which we must learn something about. I believe every man who owns an X-ray apparatus and operates it should be able to determine the amount of penetration being given by a tube. There should be a standard penetration, a standard amount of ampèrage, a standard amount of milliampèrage, a standard distance of spark gap, and these things should be regulated within limits of a small variation between the maximum and minimum for each picture, and no picture should be taken until they are so regulated. By following a comparatively simple formula, anyone can determine the amount being given by his apparatus, and can standardize it.

Another factor is the distance between the patient and the apparatus. It can be determined exactly how many exposures can be given without risk. I think we can learn more about that; it is not a very difficult thing to do, and it ought to be done as a matter of safety. I want to emphasize that point, because I do not think there has been enough emphasis given it.

"Have you reached the conclusion that the dental practitioner can make radiographs that best meet his needs, because of his intimate knowledge of individual conditions, and of the requirements of the case in hand?" There is no doubt in my mind that the dentist himself can know better than anyone else what he

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wants. He wants the position in which he can see the roots without having them overlap, and he can determine that better than a man who does not know the position of the roots.

"Have you reached the conclusion that the principles of interpretation, as understood up to the present, are not difficult of comprehension?" If you emphasize the word "principles" I should say "Yes;" but if you omit the word principles and say "The matter of interpretation is not difficult," I would take exception to that. I think it requires a large experience in order to intelligently interpret radiographs. I have seen many men who have had little experience with the radiographic outfit take a picture and make a diagnosis when their experience was so limited that they were making a false diagnosis and did not know it; because they saw this or that in the picture they thought it was a definite thing on which to make a diagnosis. We are apt to jump to the conclusion that the intelligent interpretation of radiographs is rather easy.

I do not believe any man is in position to make intelligent interpretations of radiographs, or to learn to make them, unless he is taking his own pictures. I do not believe any man can learn to make intelligent diagnoses unless he takes the pictures himself. A picture is handed you from someone else with the remark, "Doctor, what do you think about this?" You may guess at it, but unless you know the history of the case and have been acquainted with the facts, you are not in position to make an intelligent diagnosis.

"Do you sometimes find conditions of a physical nature—as malformed or excessively tortuous roots, etc.—that make treatment inadvisable?" I answered this "No" when the Correspondent sent me the report, because I believe, with the requisite amount of patience and skill in following the technique given us by our very competent operators, almost any case, no matter how difficult it may look in the radiograph, may well be attempted by the operator.

Dr. F. W. Low, Buffalo. How about the pulp at the end of the root?

Dr. Ash. I have some pictures which I think would answer that question, where the multiple foramina are very well filled. The most interesting work of that kind has been done by Dr. John Callahan of Cincinnati. He has all the material to show you those things, and he has the specimens. He filled teeth and then took them out so you would be able to see them! In regard to those tortuous roots, sometimes a case in which the picture looks as though you were going to have a great deal of difficulty will be found to be simple when you open the tooth. I mean especially where you are devitalizing a tooth. Where you find crooked roots that someone else has attempted to fill, and in the attempt the operator has gone down a distance in the canal and made a square seat, and from that point on you have a curve—those are the difficult cases; because when there is a square seat in the bottom of the canal it is difficult to find the opening. Where such a tooth has not been filled by someone else, sometimes you can get your wires right down to the apex as easily as if it were a straight-rooted tooth.

"What is the minimum number of radiographs that should be taken of each case?" Speaking exactly, I could say the minimum number is one. If an operator wants to take a chance on his work being correctly done in opening the canal to the apex, and go ahead without taking an X-ray, very well, let him do so; but let

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him check it up at the end to see that he has reached the apex. I prefer, however, in my practice, when I think I have reached the apex and would like to know that the wire is at the apex, to insert a gold wire and take a picture, because I like to know the wire is absolutely clear to the apex before I insert the filling.

"At what stages of the treatment should these be made?" When making two pictures, I think the first picture should be taken when you think you have reached the apex, and the other when you think you have filled the tooth. If you want to take three, and use one for a preliminary diagnosis, well and good. When there are diseased teeth in the mouth, any man who is making a comprehensive diagnosis finds it necessary to have a radiograph, as this should be done as carefully and with as much detail as when the intelligent physician diagnoses a systemic condition. All the doubtful areas should be radiographed, and study models of the mouth made, in order to say intelligently what is the best for the patient's welfare.

"What is the maximum number you have made of a single case?" Someone said forty. I would not care to take forty pictures of any one part of a patient's anatomy, unless there was a considerable interval between the pictures.

As to the further questions:

Do you consider it necessary to make radiographs in doubtful cases at intervals after the canals appear to have been well filled?

Do you make a separate charge for each radiograph? If so, does the patient not sometimes question the need for several of a given case?

If not in your practice, do you believe that this would be so in the great majority of practices?

Would this not be overcome by having it understood that the necessary radiographs are a part of the service, and as such are not charged for separately, but are included in the general fee?

Do you find that the time saved by radiodontic findings largely compensates for the time required in making them?

These are questions which each man must answer according to his own practice. If we make our patients understand that we are making the pictures because we want to give them the best and most intelligent service—if they are people who appreciate intelligent service they will be glad to have us make as many radiographs as are necessary to prosecute the case with the greatest efficiency; and if they are people who do not appreciate it, we had better let someone else do the work, or better still, train those people to a better appreciation of proper dental services.

Dr. W. Ray Montgomery, Buffalo. The viewpoint from which I shall discuss this report is that of the general practitioner who has used the X-ray in his own office for eighteen months, making the exposures himself but turning over the rest of the work to an assistant.

It has been of interest to compare this report with that of Dr. F. B. Prentiss, who as Correspondent of this society in 1913 made a report on the same subject. At that time the conclusions drawn were that, although it might be a practical proposition for the dentist to instal his own equipment and to do his own radiography, it was by no means essential that he do so.

From the present report we see that there has been a great change of heart by a great many men in the rank and file; that it is not only considered to be practical but also essential that the X-ray

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be used extensively in order to obtain the best results in dentistry.

What are the factors at work bringing about this great change in the attitude of the profession?

One, no doubt, is the work of Raper, who has presented to us in compact form all the theory, technique, and principles of interpretation necessary to the mastery of the subject. Another is the insistence of the medical profession on the elimination of foci of infection from the region of the mouth. Another factor is the aid which the dentist finds that he receives in his work from even a limited use of radiograms. But the determining factor, it seems to me, is the recent simplification of the apparatus.

In his discussion of the report of four years ago, Dr. Geo. M. McKee gave the following equipment outfit as the simplest from which satisfactory results could be obtained: A Ruhmkorff coil with electrolytic interrupter, a suitable radiographic chair or table, a tube stand with protecting shield, a protecting booth for the operator, and a good dark-room. This outfit required either a very large operating room or a separate X-ray room altogether, which made it impracticable for a great many men. Now we have all the necessary equipment in such compact form that it may be used in the smallest operating room, which brings it within the reach of everyone. For this result our Correspondent is largely responsible, for it was due to his efforts that such a unit was produced.

It is universally conceded that radiography is of great value in dental diagnosis. The only question seems to be as to the best method of employing it. No doubt there are a considerable number of men who would never take the trouble to master the simple details of technique. To these, the X-ray laboratory, with the interpretation given by the specialist, is open. This method served to enlighten and convince me that the apparatus was a necessary part of my equipment so that pictures might be developed and returned to me during the sitting; that often pictures are required in such numbers and at different intervals as to prohibit sending the patient out for the service. After eighteen months' constant use, after all the novelty has worn off, and it has become just one more detail in practice, I feel as dependent upon it for all operations and conditions which are out of sight as I do upon the mouth-mirror for oral examinations, and know that the best service is dependent upon it.

One of the reasons why each dentist should either do his own X-ray work or have it done under his direct supervision is that a picture taken at one angle only is seldom to be depended upon, and others are necessary. In the case of a first bicuspid, a picture taken at one angle will show but one root and one root-canal, while a slight difference in the angle will perhaps show two widely diverging roots. One angle will show a crown dowel running up the center of a root, and another may show that same dowel protruding through a puncture in the side of the root.

Another reason why it is desirable for one to make his own pictures is that although the principles of interpretation are simple, often the application of these principles is difficult, and the experience gained by studying each radiograph with full knowledge of all the conditions under which it was made will aid greatly in developing one's ability and judgment. It is highly important that one form the habit of seeing all there is to be seen on a film. It is very easy to look for the

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one thing you are studying and see nothing else. Often there are other conditions revealed of even greater importance.

Particular mention has been made in the report of the application of the radiograph to root-canal treatment; there is another application upon which I wish to lay special emphasis. It is the desirability of obtaining pictures of all roots upon which crowns or bridges are to be mounted, particularly those which have been treated by someone else, and of whose history you know nothing. With the present available facilities, one is most negligent who will place extensive bridge work or abutments that have not been studied by the aid of the X-ray.

Modern apparatus used intelligently is apparently free from danger to both patient and operator. Reasonable caution and common sense should, however, be observed. Some persons seem to have an idiosyncrasy to the ray, and receive effects from an exposure which would in no way affect others. I have recently seen two cases where head pictures had been made by a competent specialist. In one, the hair had come off the entire side of the head; in the other, from just back of the crown of the head, the hair had come out, leaving a round bald spot four inches in diameter. There was no sign of dermatitis in either case. The hair will undoubtedly grow again, but it creates an embarrassing situation. Of course, for the head picture a much greater exposure is required than for a dental film held in the mouth.

From the beginning it has been my policy to include the radiographic work as part of the service, and not make the fee dependent upon the number of radiograms made. This removes any cause patients may have for suspicion when several exposures are necessary, and serves to convince them that an endeavor is being made to be thorough. It has proved itself to be a comfortable working system.

The Correspondent should be complimented on the very comprehensive list of questions submitted, and the very large number of replies should not only be a source of gratification to him, but also an indication of the very widespread interest which has developed in this very important subject.

Dr. R. Ottolengui, New York City. I will not waste time by saying how pleased I was with Dr. Waugh's report and with the previous discussion. The question is, "Shall we have this work done by an outside specialist, or shall we do it ourselves?" I can speak from the experience of having had it done in both ways. I began by having my patients go outside. Immediately you do that, you necessarily emphasize in the patient's mind the idea of cost. A man knows very well, when he travels from your office to another man, that that man must be paid for every visit.

I have seen recently a rather peculiar and novel arrangement in one of the new office buildings in Chicago. A large portion of the building is devoted to from ten to fifteen dental offices with a common entrance hall, a common waiting room, and a maid to take messages to the different dentists. In some of the suites there are men who do only radiographic work for the others, but even that is not satisfactory, because after all, what we want is interpretation, and the only way to acquire the ability to interpret radiographs is to take them yourself and learn the angle, the penetration, and the meanings of the shadows, because *shadows* are all that these pictures really are.

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I am more than delighted to hear, in the Report of the Correspondent, my highly esteemed *confrère* using the word radiodontia. There is a question in some minds as to whether or not dentistry is a specialty in medicine, but radiodontia is less related to general radiology than dentistry is to medicine.

It has been said here tonight that no special knowledge of photography or knowledge of films is necessary. I have been doing photographic work for about twenty-five years, and it seemed a very simple thing for me to go ahead and take up this X-ray work and develop my own films; and yet last fall, when I came home, it was with much chagrin that I found I could not make good radiographs. Not believing, of course, that it was my own fault, I thought the blame lay in my apparatus, and did all kinds of things to that poor radiographic outfit. I had experts come and examine the tubes —one man was so expert that I had to pay another man to undo what he had done!

Then Dr. VanWoert said, "Maybe your developer is wrong." I said it was impossible. Then it occurred to me to test it. I radiographed a case, developed one of the films in the developer that I had been using for a year, and another film with one of the Eastman developing powders, and they were so unlike that you could scarcely believe it was the same process. So sometimes the fault is in the developer. Knowledge of the developing process is therefore advantageous.

A great many methods of holding films have been devised, and it is curious that dentists have not thought of a film-holder so simple as a bicuspid or molar clamp, one end going on the tooth and the other on the film.

In regard to the number of films, it seems to me almost impossible to get along with less than two—I prefer three —because I would rather know the direction in which I might cause difficulty than to cause trouble and find it out afterward; and that of course brings us to the cost.

One of the questions is, "Do you charge for each film?" I would rather put the question this way, "Do you charge for radiographing each tooth?" because in my opinion, if I am satisfied with one angle, that is my radiographic record; but if I need two or three, my fee would be the same. Whether I take one, two, or three, the fee to the patient is the same.

In regard to objections, I have none on the ground of expense. The objections are from fear—where the patient has heard of the danger, and is afraid. Those are nervous patients, and they must be satisfied.

With regard to multiple foramina at the apex, it remains to be proved that any real pulp tissue passes out of more than one or two foramina close to the end of the root. I have seen cases where the clinical picture seems to indicate that the pulp tissue occupies those foramina. Just so long as the external orifices of the multiple foramina are covered with healthy pericementum, forget it—don't worry about it; but when it is absolutely uncovered, the probability is that you cannot save the tooth unless you resort to amputation.

Occasionally some of these multiple foramina are quite large, and where they are, we seem to be able to cleanse them chemically with the sodium and potassium treatment. Many of those canals which do not appear before they are filled become exceedingly apparent when they are filled.

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Dr. John R. Callahan, Cincinnati, Ohio. In the first place I owe you an apology, and also the gentleman who sent out the list of questions. I did not see the questions until after the second of May, which was the day on which he wanted them back in his hands.

As to the X-ray, there are so many sides to that question that it would not be wise to attempt to discuss it as a whole at this time. So far as the man outside of the office taking the radiographs, I agree with all that has been said. I have in mind the case of a physician who had a skin eruption that was giving him a great deal of trouble. He went to an X-ray specialist and had a number of radiographs taken, and his mouth was pronounced to be in an absolutely healthy condition. He brought the radiographs to me one day, and after looking them over I said, "The pictures look all right. I see nothing from those pictures, but I would like to examine your mouth, as is my custom, and not depend entirely on the picture." First I illuminated the mouth. I like to go about it in the old-fashioned way, and I found a central incisor that looked a bit cloudy. There was no external indication; it was just one of those dead colors. On further examination I found no response to the electric current, and the patient was astonished when I said I wanted to open into that tooth. It was filled with pus—one of the foulest teeth of which I have had experience. The X-ray did not show that, as it does not show pus within the canal. If there is a rarefied area, it shows that. We must take these things into consideration.

As to the matter of fees, I think it is a great mistake to discuss fees at all with the patient if you can avoid it, and you can so train your patients that very little will be said about them. I have been in practice many years, and very seldom is there anything said about fees, because it is known in my community that if there is any objection to the fee, that patient's name is erased from my list.

In regard to placing wires in teeth, I beg all of you to be a bit careful in pushing wires down into the teeth. It should be done only under certain conditions, and never in the preparatory treatment, as it is quite impossible to pass a wire through a root-canal without forcing something out at the foramen, whether you find that foramen or not. In one of my experiments I took 220 small glass tubes, mounted a tooth in one end of each tube, filled the root-canals with various substances, and tried to pass wires through the canals; and those substances in the canals would make their mark at the apical foramen.

The canal should be opened and freed from septic conditions as nearly as possible, in order to avoid carrying infectious matter through the root.

As to the multiple foramina, I shall only say now that there *are* roots with multiple foramina, they do contain tissue of some sort, this tissue does become infected, and should be removed and the canal filled—and those canals *are* filled. Those men in New York who have been doing such glorious work in that line for a number of years do fill those canals. I have seen them, and have seen many of my own that I did not fill—because I have taken the teeth out, cut them into specimens, and examined them.

Dr. Waugh (closing the discussion). I have succeeded admirably in doing what I had hoped. I made out a list of twenty-five questions in such a manner that any practitioner might, with a

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minimum expenditure of time, answer them. A correspondent, in formulating his questions, does so with the hope that they will be answered as he desires, and I formulated my questions so that "No" was the desired answer, but that "Yes" might be given. I felt it would stimulate considerable discussion, and in that respect my ambition has been gratified. I feel that we are honored by having the paper discussed by some of the eminent gentlemen who have done so much to show us the value of the radiograph in practice.

When anything new comes to us, it is immediately grasped as a panacea for all things, and so the radiograph has been grasped by many men, not by the dentist only, as showing positively the Yes and No—as settling for all time the question that is in the balance. I want to remind you that a radiograph is merely the permanent registration of a shadow. It is not focused, and shows no perspective, as does a photograph. It does not magnify. I have seen interpretations made not by radiodontists, but by X-ray specialists, in which they venture to tell what kind of bacteria are present at the root-end. I heard one of my good friends say, "I examine every radiograph with a magnifying glass; then I can tell if there are bacteria at the end of the root." How can you see bacteria with a magnifying glass, when a radiograph does not show bacteria?

Let us get down to a sensible basis as to what the radiograph will do.

It is a record of a shadow. It will not show disease or the presence of a lesion; it will show evidence of some lesion existing, or having existed. You cannot even tell whether or not that lesion is present, therefore clinical history, as I tried to bring out, is of essential importance in reaching an intelligent decision in diagnosis. Even with all these limitations, we must have it; so let us be sensible about it. Frequently one picture of a given case will contradict another. Many of you have brought radiographs to me and asked my opinion, and I have said, "I cannot tell; I would like to see another radiograph." I suppose many of you thought I was trying to dodge the issue, but that was not the case. It is often necessary to have several radiographs at different angles to be able to judge the conditions intelligently.

A radiograph has areas of different lightness and darkness. As I said in the clinic, and I will repeat it here, the areas that least resist the passage of the X-ray will give dark shadows, and the relative densities are all that is shown in the shadow.

With regard to the danger of using the X-ray outfit, within the last two years and seven months I have personally made 4500 exposures. I value my health as much as any of you. I was a boy in my father's dental office in the city of Rochester, and I knew of men doing this work who lost, one an arm and one a finger and one another part of the body. While I was attracted to this work, I felt I would rather save my life and use it for something more useful. So that I did considerable experimental work with radiography in the beginning. With these 4500 exposures I have used just common-sense methods. Of course you should not expose yourself unnecessarily. I have a friend in this room who has made a great number of exposures, and who is in perfect health, and is raising a nice family.

Much has been said by one of our teachers, a physician who does excellent

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general radiology, about the dosage. I have made hundreds of pictures for patients, making from twelve to twenty exposures at one sitting, radiographing sometimes the whole mouth, sometimes only suspected areas or difficult areas, and in all that number there was not one instance reported where the X-ray even reddened the surface of the skin. I have had patients come to me and say, "I was sent to you as a specialist. I have had work done before, but my eyebrow was burned off, or my hair came out, and I would not care to have it happen again. If you can guarantee to do radiographic work without adverse results, I will have you do it for me." I said, "I have made about 3500 exposures, and have not even irritated the skin. The ray will not strike the eyebrows or the hair. If you want me to go ahead with that idea—I cannot make any further guaranties—I will do so."

It is not necessary for Dr. Ash—and he and I agree in the main—to say how many exposures shall be made, and what the penetration of tube shall be, or how many milliampères shall be in the tube, unless he refers more particularly to the length of the exposure. If you make an exposure of twenty-five seconds you have given a longer exposure than I would give in making ten radiographs. A continuous exposure of twenty-five seconds gives the patient a great deal more dosage than ten short exposures would with an interval between each exposure. We must think of the length of time of exposures as well as the number. We must differentiate a little more definitely.

I have made ten to twenty exposures within a single hour, and have not irritated the skin—no eyebrows dropping off or hair coming out—and I know of many men who have done the same. We hear of one of our radiographers having a finger taken off. I have talked with men who were injured, and they feel that the results were caused by the ignorance or carelessness of years past.

I think the sad part is, and the consensus of opinion bears this out, that when it becomes sufficiently evident there is rarely any cure for it—there is a cancerous tendency.

In reference to what Dr. Ottolengui said about his fingers, you do not have to expose your fingers at all. Use rubber gloves or a little clamp.

The principles as we understand them today we will know differently tomorrow, and again differently the next day. The radiographer is able to interpret things that he could not interpret five years ago. As Dr. Montgomery said, you cannot intelligently interpret the films until you do the radiographic work yourself.

You have the specialist in radiodontia. You can employ him. It does not mean you must form your own opinion alone. Show your radiograph to your neighbor, and your knowledge will grow, and each dentist will acquire a knowledge that will enable him to more accurately make a proper diagnosis. You do not need to know it all at once.

When I spoke of tortuous roots in one of my questions I thought of a nose-and-throat specialist who came into the First District Society with a handful of teeth, and said, "Look at these teeth—curved roots—fused roots—who could fill them? I have had to take out thousands of tonsils on account of your neglect. It is useless to even attempt to treat such teeth."

I want to make a distinction between the vital tooth and one in which there is periapical disturbance. If you take

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out a pulp, it is advisable to make two radiographs, one at the beginning of the filling operation with the wire in position, and one when the operation is completed; but where there is infection beyond the root-end, I think it is desirable to make three. If you are going to make only one, I think it should be made when the wire shows clear to the root-end.

Dr. Ottolengui spoke of the rubber-dam clamp for a film-holder. I have a little clamp arrangement—some of you have seen it—in which there is a ball-and-socket arrangement. This is soldered to a molar clamp, and attached to it is a little holder into which the film slides. It is not so simple as Dr. VanWoert's, but I should like you to see it.

As to the development of the film, I, like Dr. Ottolengui, had a hobby for photography. I was opposed to the idea of tank development. I thought it was absurd to turn the films into a tank and develop them in that way, and I think yet one can get better results with separate development. With experience you can do it better, and get a little more out of the negative; when developing, you can hold it to the light, and see little shadows come into it. Soft tissue will show in a negative when partly developed or lightly developed that will disappear when the same film is allowed to remain in the developer a little longer. You can get those shadows, and obtain a more intelligent idea by doing the developing yourself.

If this report has only interested you for the time being, I will feel my time has not been wasted. If these discussions do not impress you and convince you of the value of the X-ray so that you will decide to put some sort of radiographic equipment into your office, I shall feel that my effort has been more or less a failure. I was somewhat reticent about taking up this subject, feeling that all this was obvious, and must be known to everyone. Before sending out these questions, I sent a list of five questions to the president and secretary of each district in the state, and the answers I received impelled me to pursue the subject farther.

Those questions were, in effect:

(1) How many use radiographs generously, and have them made?

(2) How many use them sparingly?

(3) How many men in your district have apparatus?

(4) How many men have you in your district?

(5) Give me the names?

I hope those of you who have not been doing your own radiographic work will now go home and do the work yourselves.

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Report of the Committee on Practice.

By D. H. SQUIRE, D.D.S., Buffalo,
CHAIRMAN OF THE COMMITTEE.

DURING the past few years much has been said and written in regard to preventive medicine, the intimate relationship of a clean mouth to bodily health, and the necessity for its recognition by the dental profession. We have responded to the call, and have put forth oral hygiene as our slogan against the ingress of disease.

ORAL HYGIENE.

We accept this slogan as a good one, although we have only a hazy idea of what really constitutes the practice of oral hygiene, and are still undecided as to either its scope or its real worth. While this statement might be considered harsh, yet, in general terms, it is warranted by the inspection of mouths which are presented daily for dental treatment. This field is so great and is such an important factor in the efficiency of dental practice that this report will be confined to a discussion of those subjects which we believe are intimately connected with oral hygiene.

It seems to be very hard to inculcate in the mind of the general practitioner the thought of prevention of caries. The writer believes that this is due to the manner in which dentistry was presented to us in the classroom. The concept which a person primarily receives of any subject is the one which will be the most enduring, and quite naturally all of one's energies will be devoted along that particular phase of the subject. A serious mistake has been made by presenting dentistry from the standpoint of repair rather than from the standpoint of prevention, as we are taught how to fill cavities of decay, instead of how to prevent the existence of these cavities. Hence we always feel that the case is never in danger, even though the tooth tissues have been badly weakened and broken down by the inroads of decay, because we have been assured that our technical skill is quite sufficient to meet the emergency, and we do not even now fully realize the seriousness of the destruction of these tissues. If our minds had been as keenly trained along the lines of prevention as they have been in regard to reparative measures, the average dentist would be much more deeply concerned in the subject under discussion.

It may be stated at the outset that oral sepsis is an unhealthy state brought

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about by a multiplicity of pathologic conditions, which must be recognized and changed, in order that the laity may be protected from those lax or careless methods of dental practice which are a menace to health. There seem to be two very important items, at least, which might be considered as primal factors in a clean mouth—(*a*) education of the child, and (*b*) operative treatment.

In consideration of the first point, the principles of cleanliness should be applied very early in life—in fact, at the time of the eruption of the first teeth—and instructions given to the parents regarding the proper methods of cleansing these deciduous teeth. The child's first visit to the dentist should be made at the age of three years and should be continued at regular intervals thereafter. During these engagements lessons in the method of brushing the teeth may be taught in the operating room, so that the correct movements of the brush in cleansing all of the surfaces, the use of ribbon floss, etc., may be thoroughly instilled into the mind of the patient. This work serves as a basis for placing more responsibility on the parents, and there must be a willingness for co-operation between the parent, the child, and the dentist, in order to carry out strict hygienic treatment, and many times this trust is placed entirely in the dentist, with varying results.

This common work in which the child and the dentist are engaged will lead to the development of two very important relations between the dentist and patient—the establishment of confidence and firm friendship. A practitioner who cannot take the time to establish these sterling relationships between himself and the patient need not hope for success. The effect of prophylactic work upon the deciduous teeth is of vast importance to bodily health, as it prevents decay and possible avenues of infection through gingival irritation and pulp exposure.

OPERATIVE TREATMENT.

As to the second factor, operative treatment, this should be divided into preventive and reparative work. Preventive work includes prophylaxis and orthodontia; reparative work consists of operative and prosthetic procedures and oral surgery.

Prophylaxis is the most important agent in the prevention of decay of both the deciduous and permanent teeth, and should be thoroughly and carefully performed by the patient and the practitioner, or else referred to the specialist in this line of work. Its chief value lies in the home care which the patient gives to the teeth, and the thoroughness and regularity with which it is performed by the dentist.

Many dentists consider orthodontia as a special field of dentistry, that it pertains to occlusion, and all that this means is the alignment of the teeth. On the other hand, the orthodontist considers dentistry a branch of orthodontia, because dentistry from his viewpoint deals principally with the necessary reparative treatment of dental caries. While the dentist will not admit that this is the true relationship between orthodontia and dentistry, yet we are bound to see the reasons which prompt the orthodontist to this belief. Normal occlusion has been recognized for a long time as fundamental to the usefulness of the teeth, and to a clean and healthy mouth, yet the general practitioner often fails to realize the importance of this fact, and permits teeth to assume malpositions

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in the arch before referring the patient to the orthodontist for treatment.

The study of the occlusion of the deciduous teeth should begin during the period of their eruption, and the relationship of the dental arches should be carefully watched, with a view to recognizing any predisposing or exciting cause which would tend to an abnormal development of the jaws, and a consequent malocclusion of the permanent teeth. This is a most important period in the dental care of children's teeth, as a normal deciduous dentition is a great factor in establishing a normal permanent dentition. Any decrease in mesio-distal measurements of the crowns of the deciduous molars through decay or poor restorations by fillings; the shortening of the space in the molar region by the premature extraction of the teeth; or allowing habits to be formed which would constrict the arches, without compensating operative or orthodontic treatment, will disrupt the whole plan of normal occlusion, as it prevents the first molar from taking its normal position in the dental arch.

As to reparative work, the writer would first take up those procedures which have an important bearing upon the principles of mouth hygiene; namely, the preparation and filling of cavities, conservation of the dental pulp, and treatment and filling of root-canals.

CAVITY PREPARATION.

Every practitioner is aware of the unhealthy conditions and permanent injuries which are caused by the laceration of the gums and mucous membrane, in the cleaving of the attachment of the fibers of the peridental membrane during cavity preparation, and in the adjustment of separators, clamps, ligatures, etc.

The cavo-angle surface of all cavities should be laid in self-cleansing areas, so that they may be kept polished by the toothbrush and scoured by the excursions of food which passes over the margins during the process of mastication. In the building of the filling the correct shapes of the teeth should be reproduced. The writer here refers in particular to the shaping of the proximal and occlusal surfaces of the teeth, with a view to the protection of the gum in the interproximal space and the sustainment of the tooth in its proper relationship with its antagonists.

The points of proximal contact have been dwelt upon to such an extent by various writers that it seems unnecessary to discuss further their size, shape, or position, but if the proximal surfaces are not properly formed the embrasures will be such that food will pack between the teeth from their buccal, labial, and lingual sides, and cause as much irritation to the septal tissues as if the points of proximal contact were improperly made.

In the restoration of occlusal surfaces of molars and bicuspids the inharmony of occlusal restorations with the plane of the condyle path is more far-reaching in its effect upon the peridental tissues than it is upon mastication, as this misdirection of force causes an absorption of the alveolar process, accompanied by a recession of the bone and a consequent increased movement of the teeth, which is sure to lead to their ultimate disuse. Stress should be laid on the proper finishing of fillings, because masses of overhanging materials are a constant source of irritation to the gum tissue, and these irritated surfaces are likewise a constant menace to health.

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CONSERVATION OF THE DENTAL PULP.

The dental profession today is face-to-face with a serious question in regard to pulp conservation versus its destruction. If we look at the matter squarely, we know that the dental pulp will degenerate eventually under its usual environment; that its function ceases after the dentin has been formed, and that improper insulation of filling materials hastens its destruction through stimulating its cells to greater activity in forming large deposits of secondary dentin for its protection.

On the other hand, care in lining all cavities, either with a balsam or a cement, will retard this process of degeneration. At the same time we are aware that, as the patient grows older and these degenerative changes take place, difficulty of access to the ends of the root-canals increases, and our chances of successful treatment decrease in proportion. It has been recommended in the past that we should take advantage of these retrogressive changes, and devitalize the pulps and fill the canals before such pathologic alterations take place, as we should then have a greater opportunity for success in the permanence of this work.

Before the days of the radiograph we did not hesitate to do this, because our technical skill had been developed to a maximum, and with the improved instruments which we had at our command we felt that this work could be successfully accomplished. At the present time, however, there is a growing sentiment against pulp devitalization, due in a large measure to the careless methods of procedure.

DESTRUCTION OF THE DENTAL PULP.

In the devitalization of the dental pulp and during the after treatment, it is the consensus of opinion that the pulp cavity must be protected from the saliva, and it is just as imperative that other sources of possible contamination should likewise be excluded. The hands cannot be made surgically sterile, and even after being scrubbed they come in contact with many unclean things, and yet they are employed in placing the cotton on the carriers, and handling the dressings, broaches, reamers, paper and gutta-percha points—in fact, everything that we use in a root-canal. Therefore in order to protect the patient from the operator's hands rubber gloves should be used during the operation of cleansing root-canals. Moreover, everything that is placed in a canal should be sterilized immediately before its use. The writer has been assured that a sterilizer for this purpose will be shortly placed upon the market. It will fill a long-felt want, because more infection is carried into the canals by the present-day methods of practice than can be destroyed by the medicaments we use.

We cannot allow the medical man to order teeth removed at will, because he is only "robbing Peter to pay Paul." It is our duty to take every precaution possible against infection so that the radiograph will show an intelligent technique and proper sterilization.

TREATMENT OF DEVITALIZED PULPS IN DECIDUOUS TEETH.

In the treatment of devitalized pulps in deciduous teeth the operator is confronted with a difficult problem, as the roots are constantly being absorbed, and the foramina are consequently so large as to preclude accuracy in filling them; and again, gutta-percha, aristol and glycerin, and euca-percha are not highly satisfactory materials for use in these cases.

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When such teeth are presented to us for treatment, would it not be better practice or a more healthful operation to remove them, and maintain the space by an orthodontic retainer until the eruption of the permanent teeth? In the opinion of the writer the latter course would be much less harmful to the child, and would be a nearer approach to hygienic practice.

When the pulp of a first molar becomes devitalized before the formation of the apices of the roots it should not be considered an analogous case to that of a devitalized pulp in a deciduous molar. While the conditions to be met are about the same as regards the technical procedure and treatment, still there are reasons which make the retention of the first molar paramount to everything else, and this is never true with the deciduous molar after the eruption of the first permanent molar. Palliative treatment is often necessary in order that this tooth may be retained until the second molar has taken its place in the jaw, and not until then should the first permanent molar be removed and an artificial tooth substituted.

IONIZATION OF ROOT-CANALS.

In the treatment of teeth with devitalized pulps where infection already exists, the writer wishes to refer to an article written by Prinz,* in which he sets forth the value of electro-therapy as a means of root-canal sterilization. The efficiency of chlorin is well known as a disinfectant; it is the active constituent of the Dakin formula, which is used after the Carrel method in sterilizing gunshot wounds in the hospitals abroad. Allow me to quote briefly from the article:

The rationale of sterilizing an infected wound surface by the Carrel method is based on the following conception: "To render an infected wound sterile it is necessary to employ a suitable antiseptic in such a manner that the chosen antiseptic comes into contact with every portion of the wound; that the antiseptic is maintained in a suitable concentration throughout the entire wound, and that this constant strength is maintained for a prolonged period. If these conditions are fulfilled, every wound will show its response to the treatment by the diminution and disappearance of its micro-organisms."

Prinz says that the ionization of a one per cent. sodium chlorid solution by means of a galvanic current within a root-canal furnishes free chlorin in the nascent state, in the presence of moisture and body temperature, which is most active and well suited for our purposes. The free chlorin sterilizes the walls of the root-canals and bleaches the discolored dentin. Incidentally, the ionization of the salt water furnishes a small amount of hydrochloric acid, which acts as a superficial solvent of tooth structure and enables the operator to enlarge the root-canal more easily.

For root-canal disinfection a one per cent. solution of sodium chlorid in water is best suited, and is made by dissolving a scant teaspoonful of salt in a pint of boiled water. Prinz, by careful experiments, has worked out an equation whereby accurate knowledge in regard to complete sterilization of the surface of the average root-canal may be obtained.

Prinz says a definite relationship can be established between the strength of the current, the time of application, and the resultant sterility. He credits Zieler with noting the inter-relationship of these factors and suggesting the use of the constant *thirty* as a working basis for clinical applications. By multiplying the milliampères employed by the time in minutes used in the process of obtain-

* "Electro-sterilization of Root-canals." *Dental Cosmos*, April 1917.

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ing a sterile root, a number invariably was obtained which was about thirty. Hence the constant thirty may be looked upon as expressing in units the surface area of an average root-canal. In sterilizing a root-canal, a glance at the milliampèremeter will show the number of milliampères employed, and the constant thirty is divided by this number, which gives the length of time for which the current must be applied to sterilize the root.

THE METHOD OF TREATMENT.

The patient is seated in the chair and covered by a rubber apron large enough to reach over the chair arms, in order to protect him from accidental shock by grounding the current. The rubber dam is adjusted, all metallic fillings removed from the tooth, and the root-canal freed from débris by mechanical cleaning. The canal is then flooded with a one per cent. solution of sodium chlorid. The patient takes a firm hold on the negative electrode with the hand, on which there must not be rings or bracelets.

Before introducing the freshly flamed positive pole into the canal, the operator should see that the knife switch is open, and that the controller is set at zero. The needle is introduced as near to the apex of the root as possible, and the knife switch is closed. The current is very slowly turned on and the patient asked to raise the hand at the slightest sensation. Upon signal from the patient, the controller is turned slightly back, left at this point for about half a minute, and again very slowly turned forward until the patient responds again. This point Prinz has termed the "irritation point," and noting the number of milliampères employed, the amount of time necessary to sterilize the root-canal may be quickly calculated by dividing the constant thirty by this number.

After finishing the operation, the controller is slowly turned to zero, the knife switch opened, and the electrode removed from the tooth. A wisp of cotton or a cone wet with salt water is then placed in the canal and the latter is stopped with gutta-percha. The treatment should be repeated within forty-eight hours, and if necessary, again on the fifth day. As the migrating ions do not develop their maximum degree of therapeutic efficiency during the time for which the current is applied, it requires about twenty-four hours for their full activity to develop.

The clinical indications of complete sterility are a definite odor of chlorin, and the removal of a paper or cotton cone clean from the canal, after it has been sealed therein for forty-eight hours. Prinz also says that acute types of periapical inflammation yield readily to electro-sterilization if the salt solution and the positive electrode can reach the seat of infection. In cases of abscesses which are draining through the root-canal, the positive electrode is passed through the foramen into the abscessed cavity.

In case of an abscess with a sinus, provided the necrotic area involved is very small, it is important to first establish communication between the root-canal and the mouth of the sinus by flushing with warm salt water. The root-canal is then treated, after which the positive pole is passed into the sinus, carried along the track until the root is felt, and the negative pole, consisting of a piece of copper wire surrounded by salt water, is placed in the root-canal, and the contact made. Usually, a lower milliampèrage is used for such work. All canals should be filled immediately after the last treatment.

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THE FILLING OF ROOT-CANALS.

The same precaution regarding aseptic methods of procedure in the treatment of root-canals should be employed during the filling process. Barrett, more than twenty-five years ago, said that he was convinced that there were branching canals from the main pulp cavity, and today his statement has proved to be correct. Callahan has demonstrated that these branching canals cannot be filled by direct pressure. He recommends that a balsam be introduced into the canal and carried through the apex by a pumping motion, using a gutta-percha cone as the plunger. In this manner the tubuli, the lateral canals, and the apices are sealed by the balsam and the cone. This method necessitates the enlarging of small canals sufficiently to allow the passage of a gutta-percha cone to the apex.

There are some operators who can fill root-canals exactly to the apex, others beyond the apical foramen, and still others who fill them "somewhere in France." It would appear that those operators who fill root-canals exactly to the apex will be the safest men to employ in the future;—after a few years have passed and clinical reports are published of those operations where gutta-percha cones are still waiting patiently to be encapsulated.

PROSTHESIS.

Any artificial restoration which interferes with the physiologic function of the remaining teeth and their surrounding tissue is a contributing cause to an unsanitary mouth, and is therefore productive of disease. All ill-fitting banded crowns, fixed bridgework, unbalanced anchorages for partial dentures, and above all, those substitutes which are not in proper occlusion, are a menace to a healthy mouth and must be eliminated.

In conclusion, it is quite apparent that if we would render the best service, we must introduce oral hygiene into dental practice and follow its principles as closely as we can. This means that some of us will have to change our present methods of practice; if so, let us do it immediately.

There seem to be two ways of conducting a dental practice today: First, one in which the more complex operations are performed by the practitioner, leaving the polishing of fillings, treatment and filling of root-canals, and general prophylactic work to a graduate assistant. Secondly, the limiting of the number of patients so that the dentist may do all of the operative work himself, employing a mechanic to do the laboratory work.

Many of us know by experience that there are very few practices in which a graduate assistant can do a portion of the work without complaint from the patients; yet it could be done by a competent graduate dental nurse.

In medicine, the nurse can do a great deal to assist the surgeon or physician in charge, because the patient feels that she is not taking the initiative in the work, but is following the direction of the medical man. This would be equally true in dentistry, but at the present time the dental nurse is not sufficiently educated to be a competent assistant in the general practice of dentistry. Her education is too meager, and her duties are too limited by law.

The dental nurse will do much toward solving the question of practical oral hygiene, and in anticipation of this we must go a step farther, and train her more thoroughly in the fundamental principles of dentistry. A requirement of two years of high-school work and two years of dental training would be a long step in this direction.

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Removable Hygienic Bridge Work and Partial Dentures.

By J. WRIGHT BEACH, D.D.S., Buffalo.

PERHAPS at the present time no question is of greater importance in dentistry than that of the best means of supplying lost dental organs. From time immemorial there has been evidence of more or less intelligent consideration of this subject, and examples of ancient dentistry are to be seen in the museums of Europe in which considerable ingenuity has been displayed in the construction of so-called bridgework.

Modern prosthesis in this special field has revolutionized dental practice, as well as being responsible for the world-wide fame of American dentistry. How well we may merit this preferment is not within the province of this essay to discuss. However, we may feel assured that from the standpoint of mechanical skill, artistic restoration of outline and occlusion, ingenuity, and practical results the American dentist will be able to retain his well-earned laurels without additional effort.

Marvelous methods, wonderful skill, and painstaking technique have been and now are being exhibited by thousands of our craftsmen, thereby rendering a service of untold value to humanity. The beautifully finished, esthetic piece of work appears to the lay observer to be permanent and well-nigh indestructible, yet the dentist sees beyond the highly polished surfaces, and knows that the faultless product of the skilled artisan is not more lasting than the weakest root of its abutments. The searching scrutiny of the dental radiograph all too frequently dissipates apparent truth, and the obstinate arthritis in the great toe-joint spells the death sentence to the bridge that had been the pride and joy of some hardworking, conscientious dentist. Hours of time, detail, thought, and an infinite amount of nerve strain come to naught, and the cold steel mercilessly tears away the glory of our inspiration.

The method about to be described has been dignified by the title "Hygienic Bridgework," and is applicable to a broader range of usefulness than any other method previously devised. We believe the few simple principles underlying this method to be capable of universal application, and we look to the ingenuity of the American dentist for its fullest development; therefore it is not presented as a complete system, but rather as a suggestion to the dental profession of the possibilities which it carries. Present

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conditions in our own country lead us to fear that we may be called upon to devise the best means of retaining extensive restorations made necessary by gunshot wounds and various other destructives used in battle. This method presents great latitude to the prosthetist in this respect, and should help us out in many puzzling cases. Even though we may not need it for our own countrymen, we shall likely find use for such devices in the treatment of many mutilated unfortunates who will flock to this country after the European war. It also furnishes a quick and practical method of supplying teeth necessary for applicants for enlistment to meet army requirements. A one- or two-tooth bridge may be made in an hour by this method.

The requirements for the bridgework restoration may be summed up as follows: First of all the object is to reproduce adequate masticatory surface; second, to obviate unnecessary destruction of or interference with abutment teeth; third, to give the maximum degree of comfort; fourth, to occasion the minimum amount of pain and discomfort in the accomplishment of these several requirements.

Present-day patients have a right to expect methods of dentistry that are commensurate with present-day progress in every other field of endeavor, and in consequence we must meet these demands if we are to give the greatest good to the greatest number. We are not able to supply more than one-tenth of the need for dental service throughout the civilized world, and if we wish to be looked upon as real benefactors, imbued with the true spirit of our profession, we should increase our endeavors to more nearly meet this need in so far as we are capable. The method we champion was developed with this thought as one of its fundamentals.

It is essentially a method of retention based on the use of bars, rests, and clasps. These may be said to embody the salient features of the suspension and cantilever principles, and may be adapted to the case in hand according to the ingenuity and ability of the operator. In other words, the success or failure of this method depends upon the proper combination of these various principles in their application to a specific case; therefore it furnishes almost an illimitable range for the dentist's capabilities, and is, in consequence, extremely fascinating and engrossing.

I believe the adoption of this method to depend in a great measure upon ridding our minds of a few well-established prejudices which have been, from time immemorial as it were, handed down from generation to generation of dentists, and from which it is high time we were released. First of all, we must be convinced that a correctly made and placed clasp *does not* injure enamel surfaces with which it comes in contact. It will take much argument to drive the contrary notion out of the minds of many dentists who cannot rid themselves of the picture of the old-fashioned broad clasp. Did you ever stop to seriously consider the fact that no matter how broad or narrow a clasp may be, it has but *one point* of contact occluso-gingivally? And if it be swaged or burnished to the bucco-lingual surfaces to give close contact over a broader area, does that help the situation? Not at all. A correct clasp must have minimum contact with the enamel surface, and be as nearly stationary as possible. Round wire of the smallest adequate gage is most satisfactory, as the

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contact will be only a line. I have yet to meet with the *first instance of disintegration,* either superficial or otherwise, occasioned by a clasp made of round wire.

The occlusal finger-rest is an essential part of the clasp, as it keeps the clasp from pressure upon the gingivæ. Space for this rest between occluding teeth is secured by careful trimming from each tooth for its accommodation, after which the surfaces are thoroughly polished. The universal clasp used in this method may be termed the modernized three-point Bonwill clasp, which has been in use a great many years.

Another so-called prejudice—which perhaps might better be denominated fear—is that these bridges are liable to come out, and possibly be swallowed by the patient. I can assure you that such probability is very remote, as of the hundreds I have placed not one has thus far passed beyond the mouth on the alimentary route. Their retention and location are assured, and no anxiety need be felt so long as the construction and placement of the bridge is correct. These pieces are easily cared for by the patient, who can remove and replace them at will. They are also removed by the dentist during general prophylaxis treatment, properly cared for, and replaced.

One might recount a considerable number of reasons for and against this method, but actual experience seems to have eliminated the major percentage of objections in my hands, and in the further development of this method it must prove a most satisfactory means of supplying lost dental organs.

The method consists in the adaptation of different sizes and forms of gold clasp wire to meet the requirements in a given case.

The figure shows a cuspid carried by two clasps. It is thoroughly practical in the great majority of cases, but is recommended only when other attachment cannot be obtained without undue loss of good tooth structure or normal pulps. It is safe practice to use modeling compound for taking impressions if the teeth are parallel longitudinally, and not so placed as to occasion much "draw." Slight distortion may be allowed for, and sometimes the approximating tooth surfaces may be trimmed with safety. A good plaster impression, however, is preferable. After the model is mounted, the clasp wire is easily formed to the tooth surfaces, the tang or finger-rest fitted,

and caught with hard wax to the clasp wire. The second clasp is formed in the same way; the backing for the interchangeable porcelain is adapted, and caught to the clasps with wax, after which the porcelain is ground to its proper position. The porcelain is then laid aside, the clasps and backing carefully removed, invested, and soldered. The framework is fitted to the teeth in the mouth, attention being given to proper occlusion of the tangs. The porcelain is then adjusted and occluded, after which the piece is removed, the porcelain cemented to place, and in from ten to fifteen minutes it is ready for the mouth. This procedure is applicable to all bridges where interchangeable teeth are used. Gutta-percha cement is well adapted for use in these cases, as, if occasion requires, the porcelain may be removed without difficulty.

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More than two substitute teeth, as a rule, should not be supplied without the aid of a saddle, because of the strain upon the abutment teeth. This caution applies to fixed bridgework just the same. In some cases three teeth may be carried by this method without the aid of a saddle, where the appliance does not interfere with the natural movement of the abutment teeth in their sockets.

DISCUSSION.

Dr. A. E. Sager, Rochester. I have seen two or three cases in the mouth, made by the method Dr. Beach has described, and they seem to be very practical in certain instances, but the cases have to be very carefully selected. I saw a mouth the other day, in which the work was beautifully done; the appliance went into place readily, and held as strongly as a good bridge, or almost as firmly as a fixed bridge. I would not, however, put one of these appliances in the mouth of a patient unless I were absolutely sure that I could see him at least once a month for prophylactic treatment.

I wish to describe the condition in which I found one mouth recently. The patient's wife came to my office and wanted to know if I could suggest some local remedy for her husband. His teeth troubled him so much that he was almost crazy. I suggested some hot applications, and two or three days later the patient reported. There were six upper teeth held in by clasps—I think a molar, bicuspid, and cuspid on each side. There were clasps on each side, and as beautifully made as anything I ever saw, and the appliance was as firm as could be. I asked, "How long has it been since you went to your dentist?" The man replied "One year." I said, "Don't you know better than that? That explains the whole condition. When you were going to your dentist regularly, how often did you go?" He told me, once a month. Every one of the anchorage teeth had tartar on it extending under the gums, and there was gum recession. The man was large and powerful, with large, long teeth. Erosion had taken place on the distal side of the cuspid, but there was not a tooth surface that was not extremely sensitive. He was suffering every minute; it was almost impossible to do anything for him, and it was most difficult for me to give him relief. The only way seemed to be to devitalize each one of those teeth, or extract them all. His appliance was beautiful, and it fitted as firmly as anything you ever saw.

There is where the whole method is going to fail. It is very good in the case of a patient who will follow up the prophylactic treatment. I do not care if this man kept his teeth in the cleanest condition, if he did not have the care of his dentist every little while he could not possibly keep those teeth properly cleaned. They have to be cleaned with the aid of tapes and floss and a lot of things the patient cannot use himself.

I will say this about the round-wire clasp; it is certainly *the* clasp, but the success of the appliance hinges, to my mind, on the dentist taking care of the teeth.

We talk about clearing up infection;

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but have you read the last article from the Research Institute of the National Association on streptococci? One of these appliances placed in the mouth and not properly cared for is more liable to cause septic infection—because the streptococcus is most constant in the mouth—than anything else you could do.

It is like the story of the man who did not have the heart to cut off the entire tail of the puppy-dog at one time, so he cut it off an inch at a time. If this man could not afford to have a good removable bridge made for his case, the teeth should have been extracted, and a full denture made for him, for now, after only a year, he will have to have one or the other done.

Dr. H. E. S. Chayes, New York. The sum total of what I have to say about this paper—and I am sorry to say it in the absence of Dr. Beach—is that such appliances are wholly unfit for the human mouth. When the Divine Principle designed the human masticatory apparatus, it did not provide for clasps, clamps, and such things; and no matter how finely these things are made, they so change the shape of the teeth after the appliance is in place that neither the tongue, the lips, the cheek, nor the nervous system of the patient can ever, during the time that contrivance is in the mouth, become so used to this apparatus as to be free from its morphologic influence.

Dr. Sager told us about the case that fitted beautifully, and yet he could not touch the teeth. The anchorage teeth were vital when the appliance was first inserted, but it would necessitate a monthly visit to the hygienist or dentist to keep it clean. Anything that would require a monthly visit to the dentist to keep it in condition is self-condemnatory; it is not rational; as a means of maintaining hygienic cleanliness and normal conditions it is absolutely absurd. If that is the best we can do, and with it have to send the people to the dentist to have their mouths cleaned once a month, it is a pitiable sort of restoration, and spells enslavement of the patient.

Dr. Price showed us how we could take out a tooth and scrape the socket and find infection. We need not have a devitalized tooth to have infection; we do not need absolute death to have these organisms present in our bodies, but they are always there, in every animal body that lives on the face of the globe, and until we come to realize that God Almighty never intended bacteria to take hold of a human being who understands the laws of life and lives them normally, we will be in constant fear of these micro-organisms.

Remember that when you make any restoration in the human mouth, you must leave the teeth in exactly the same shape nature gave to them. We must leave them in exactly the same relation to their neighbors as nature placed them. For 500,000 years nature has been trying to teach us how to construct a tooth, and we, with our puny art, put a harness of this kind into the human mouth and attempt to improve on the work God Almighty did.

Dr. Low. Does He not do some bad jobs?

Dr. Chayes. No. The badness consits in your misconception. We cannot blame the Almighty for the evil that is upon this earth. If one has the necessary humility, he will go to the Divine Principle upon his knees, and say, "Show me how you did this, so I may imitate you." God Almighty did not ask Peeso, or Charlie Ash, or Beach, or

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me; but I had the common sense and humility to ask Him how He did it, and I found a way.

We do not destroy pulps needlessly, or remove pulps from teeth in order to do bridgework. It is far more destructive to place a clasp upon a tooth, a clasp which has contact with the enamel surface, than to cut through the enamel surface and reach into the dentin to get your contact; because if dentists only applied common sense and reason, they would think for a minute and say, "What is the enamel of a tooth?" You will find if you go back to your histology and embryology that the enamel of a tooth comes from the ectodermic layer of the blastoderm, and any trophic irritation of that is reflected constantly back to the central nervous system. The dentin is connective tissue, and does not come from the ectodermic layer, and will stand the contact without such baneful results. Why do you suppose that patient was suffering constantly from the irritation from that appliance—with all his enamel so sensitive that you could not touch it? Just because of this; and that is why small exposures or small areas of erosion are so sensitive. The tooth is not an extraneous organ, but intimately connected with every part of the organism, especially the nervous system, because of its topography and its relation to the central nervous system. There is something more than mechanics in dentistry or the operator's narrow vision of the one particular tooth he is working on. I am sorry Dr. Beach is not here to hear this—anything that disrupts the organization in the human mouth, even though that apparatus be perfect in its relations, is wrong in principle and violates the laws of physiology. Think more of the physiology than the pathology; think more about the normal than the abnormal.

We must have vision and understanding and wisdom, and a knowledge of constitutions, and be able to read our patients. I came here in the hope that Dr. Gies would be here to present his paper, because I think the hope of the human race, dentally speaking, lies in the understanding of the meaning and influence of the secretions that he is trying to work out for us. That is the way we will solve this problem, not by monthly visits to the dentist to prevent decay. We have known many clean teeth to decay. We must begin prenatally, and be able to say what the father and mother of the child were. We may modify much of the child's tendencies, and bring the child through the crises better if we understand his organization, and we cannot do it simply by monthly visits to the prophylactician. I do not intend to be personal, but I want to be certain you understand my position. We all want the truth, and nothing but the truth, and let us not try to make the social economic condition that exists in this country today an excuse for work such as shown. If the poor man is good enough to go to war and be shot, he is good enough to get the best there is in the country for his mouth.

Dr. White, Syracuse. I would like Dr. Chayes to take the platform again, and tell us how he would handle these cases.

Dr. Chayes. I would be perfectly willing to demonstrate to you if you would come to New York. It would take me some time to show you the method I approve of, and you would get no lucid explanation from the few words I could tell you in this short time; but briefly, I would say there are certain geometric laws for all beings you see in the world—human beings or animals.

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Report of the Committee on Scientific Research.

By ARTHUR H. MERRITT, D.D.S., Chairman.

YOUR committee begs to report that it has, under the direction of Dr. William J. Gies and his collaborators, continued its studies of the influence of internal secretions on the development and condition of the teeth. These studies have been conducted along three main lines—

(1) Effects of thyro-parathyroidectomy. (2) Effects of parathyroidectomy. (3) Passage of substances into and through the enamel.

Tests have been made regarding the validity of the physiological and chemical methods available for these and similar studies. The discovery of a new physiological constituent of teeth, which has been called dento-mucoid, has also been made.

A detailed report of these investigations will be made by Dr. Gies in his annual report before the society, a brief abstract of which has been published, and will be placed in the hands of the members.

The work of your committee has been greatly facilitated by the generous gift of $1000 made by Dr. Newell S. Jenkins for the extension of dental research, following a meeting of the First District Dental Society at the New York Academy of Medicine, November 1, 1915, the sum given to be expended by Dr. Gies as in his judgment seemed wise. In harmony with Dr. Jenkins' liberal purpose, the gift has been devoted to the purchase of apparatus which Columbia University could not provide from its current funds, and which also could not be obtained at the expense of any of the annual appropriations for dental research now being made by the First District Dental Society, the Dental Society of the State of New York, and the National Dental Association, without seriously disarranging the plans for the work in progress under the auspices of these societies. The enlarged equipment thus provided has greatly amplified the scope and increased the efficiency of these investigations, making possible the extension of researches otherwise impossible.

The Dental Society of the State of New York has thus been made the beneficiary of Dr. Jenkins' generosity. Your committee through its chairman has written to Dr. Jenkins under date of September 6, 1916, thanking him on behalf of this society, and expressing their appreciation of his gift.

Regarding the expenditures for the year 1916–1917, the following is quoted from Dr. Gies' report to the chairman of your committee:

"It has been possible to conduct our work for the year to our full capacity and with generous assistance, and in spite of very great advances in the prices of

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supplies, at a cost to your society of only $500, although I was authorized to draw upon you for $1000."

At the beginning of the present administration there was on deposit in the Empire Trust Company of New York, to the credit of your committee, $510 as the unexpended balance left over from last year. To this has been added by check from the treasurer of the Dental Society of the State of New York, under date of April 28, 1917, $500.00, and by accrued interest $7.66, making a total of $1017.66. Against this total Dr. Gies has drawn, under date of April 19, 1917, upon the committee for $500 as follows: Columbia University, in repayment of the cost of animals and supplies, $200. Elizabeth C. Franke and Hattie L. Heft, for assistance given Dr. Gies in dental research, during the year 1916–1917, each $150, or $300. Receipts for these expenditures are in the hands of the committee. This leaves on deposit at the Empire Trust Company a balance of $517.66.

In addition to the above, Dr. Gies has received direct from the Research Commission of the National Dental Association, as in the two preceding years, the sum of $500, in ten monthly instalments of $50 each, which sum has been expended by him for salary to laboratory assistants.

Under date of November 21, 1916, the chairman of your committee received from Dr. Gies the following communication, copy of which was forwarded at that time to the secretary, Dr. A. P. Burkhart:

DR. ARTHUR H. MERRITT, CHAIRMAN OF THE DENTAL SOCIETY OF THE STATE OF NEW YORK.

Dear Dr. Merritt,—From the beginning of my association, in research, with the Committee on Research of the Dental Society of the State of New York, I have made it clear to the chairman that I could not accept, with professional propriety or with personal satisfaction, the necessity of publishing in the *Dental Cosmos* the official reports of our research. I stated that the papers from our laboratory were not published in trade journals, because we object to the impertinences of and demoralizations by trade influences in professional affairs, and because we do not intend to lend support to such influences, directly or indirectly, purposely or indifferently. I also said it was personally and professionally humiliating, in the distribution of reprints from such journals, to seem to be hucksters for the supply houses involved. Our objection is to the system and its abuses, not to a particular journal representative of it.

In presenting this objection to the publication of our first scientific report in the *Dental Cosmos* I learned of the apparent helplessness of the Research Committee in the matter of responding to my desire to publish our report, originally, in an independent journal; and then, confronted with the necessity of deciding either to go ahead under that embarrassment, or to abandon the higher purpose to endeavor to be professionally useful to the society, I chose the latter alternative, in the conviction and with the mental reservation involved in that belief that it could not be long before the Dental Society of the Empire State would *feel* the professional impropriety of accepting financial favors from supply-house journals, and would not oblige or expect its investigators to submit their official reports to exploitation in trade journals. Five years have passed, and the situation is unchanged.

I now regretfully inform you and your associates of my desire to retire next May from my present relation with your Research Committee, and from my service in behalf of dental research under the society's auspices, because I am unwilling any longer to submit my reports of our work to original publication in the *Dental Cosmos* or in any other supply-house journal.

I take this action confident that the work of research now in progress under the society's auspices will be carried forward by others who are quite as eager as we are to proceed, but who may have less objection, for

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the present at least, to publication of their reports in the advertising periodicals of dental supply houses.

I shall continue to the end of our research year, and will prepare our next annual report, of course, without any change whatever in my attitude toward my obligations to you to the end of that period.

My relations with your committee and with its members individually have been continuously so pleasant and stimulating, and my attendance at the meetings of the State Society has been uniformly so profitable and agreeable, that I shall keenly regret the termination of official associations which have occasioned for me a wealth of personal and professional gratifications—remembrances that I shall always treasure.

Yours sincerely,

W. J. GIES.

Recently the bound Transactions of our society for 1916 appeared without Dr. Gies' report for that year. Dr. Gies informs us that upon submitting the manuscript of the same, he received word from the publishers that the Transactions had been printed. He also states that while he received routine letters last autumn from the secretary of the society and the S. S. White Dental Mfg. Co. requesting him to send his report, he did not receive thereafter any communication fixing a time limit during which it would be necessary for him to send in his paper. Dr. Gies' time has been more than filled with matters of public importance, and he was seriously delayed in preparing his paper, facts which were made known to your committee and to the publishers. He assures us however, that a hint as to a time limit would have caused him to make a special effort to meet the requirements. It seems that neither our society nor the publishers made any effort, beyond the two routine letters mentioned, to secure for publication Dr. Gies' report of his work for 1916–17.

It will be recalled that the *Dental Cosmos* declined publication of Dr. Gies' report of 1915, and that in its report last year your committee vigorously protested against this action, not only because it would be preposterous for our society and the Research Committee of the National Dental Association to continue a joint annual contribution of one thousand dollars for work which was not to be published, but because of the injustice and the indignity imposed upon Dr. Gies by such procedure.

Following this report, it was voted by the society—"That in consideration of the present financial condition of the society, the contract for publishing the Proceedings with the S. S. White Dental Mfg. Co. be renewed for the year 1917, which contract shall carry with it the publishing of Dr. Gies' complete report on Scientific Research."*

The failure of the S. S. White Dental Mfg. Co. to comply with these conditions is clearly a violation of their contract, and emphasizes the exceeding desirability of some change being made in the publication of our annual Transactions. In view of the circumstances above mentioned, your committee very reluctantly recommends that Dr. Gies' resignation be accepted.

In doing this, they greatly deplore a situation in which the Dental Society of the State of New York loses the services of an eminent investigator in dental science under circumstances which imply an indifference to his labors of many years.

Respectfully submitted,

ARTHUR H. MERRITT,
WM. B. DUNNING,
W. RAY MONTGOMERY,
Committee.

* *Trans. Dental Society of the State of New York*, 1916, page 12.

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Studies of Internal Secretions in Their Relation to the Development and Condition of the Teeth.

5. A Summary of Miscellaneous Findings.[1]

By WILLIAM J. GIES, Ph.D., Sc.D., New York City,
AND
COLLABORATORS.

(From the Biochemical Laboratory of the Schools of Medicine and Dentistry, of Columbia University, at the College of Physicians and Surgeons, New York.)

BEING the *seventh* annual report, by William J. Gies and collaborators, on investigations under the auspices of the Research Committee of the Dental Society of the State of New York, Dr. Arthur H. Merritt, chairman; and the *third* annual report on investigations under the auspices of the Scientific Foundation and Research Commission of the National Dental Association, Dr. Weston A. Price, chairman.

I.

AT the annual meeting of our society in 1914 I reported the results of studies of effects of internal secretions from the standpoint of the REMOVAL or impairment of such secretions. We found, working on very young white rats, that extirpation of the *thymus* was without effect on dentition; and that excision of the *thyro-parathyroid* tissues was followed by very slight, if any, tendencies to diminished dental calcification.

2. At the meetings in 1915 and 1916, we reported the results of studies of effects of internal secretions, from the standpoint of the ADDITION or improvement of such secretions. We found, summing up the data of the annual reports for these two years, that dental calcification appeared to be (*a*) regularly

[1] The concluding report (abstract) of work done, by the author and his collaborators, under the auspices of the Dental Society of the State of New York, the author having resigned his directorship of research in the service of the society. These studies will be continued under the auspices of the Research Institute of the National Dental Association and of Columbia University. See Note on page 111 and the first footnotes on pages 112 and 131.

This abstract is practically identical with that of the report to the National Dental Association at its recent New York meeting (to be published in the Journal of that association). The present abstract does not contain any allusion to the exhibits that were shown at that meeting.

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decreased, in growing white rats, by oral administration of *lymphatic, salivary,* or *thyroid* gland; (*b*) regularly increased by oral administration of *testicle;* and (*c*) wholly unaffected by oral administration of *corpus luteum, parathyroid, pineal, pituitary, spleen, suprarenal,* or *thymus.*

There were no effects on the condition or dimensions of the teeth in any of the experiments referred to above.

Castration was also found to be devoid of influence on dentition in growing male rats.

3. At the meetings in 1915 and 1916, we reported, also, the results of preliminary experiments on related subjects (particularly results of experiments on dietary deficiencies and on additions of acid to the food, on dental and osseous calcification in rats and dogs), which, with further extensions and the addition of new themes, constitute the foundation for the findings for the current year, and of which this report is a very general statement.

4. When we reported our results at the last meeting of the society (1916), we had obtained clear and definite chemical indications that dentition is affected by certain modifications of some internal secretions, but is unaffected by various modifications of other internal secretions. Our results strongly indicated the need for a continuance of the types of experiments we had been conducting in this relation.

It is plain that, at present, the *principles* underlying the possible influences of internal secretions on dentition can be most accurately and effectively studied on laboratory animals. It is equally clear that any such *principles* that may be discovered can be most satisfactorily studied, from the standpoint of human dentition, after the nature and effects of physiological variations, in the dentition of laboratory animals, are duly recognized—after such variations are understood, and after means for their control, or for their discount, have been firmly established. Those who may be disposed to disparage such experiments as our own on laboratory animals forget that most of the *principles* of human physiology and pathology have been discovered through studies of laboratory animals, and that adequate direct experiments in our own field, on human beings, at the present stage of our knowledge of this complex subject, cannot be attempted on a humane basis.

A few dentists, who substitute fancies for facts, talk freely of the effects of internal secretions on human dentition, as if their observations were clearly based or their opinions scientifically expressed. In our own studies we have learned that the farther we proceed in this work, the more caution is required in the interpretation of the results obtained.

II.

5. Repetition of our experiments on the effects of *thyro-parathyroidectomy* on dentition, in young white rats, has again given negative results. Removal of the *parathyroids* in such animals, however, without material disturbance of the thyroids, has been followed by deficient calcification in practically every experiment. There were no effects on the general condition or dimensions of the teeth.

These particular results indicate that our negative dental findings, after *thyro*-parathyroidectomy, have been due to mutually antagonistic (balancing) influ-

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ences by thyroids and parathyroids on dentition. The results suggest that possibly the thyroids normally tend to induce *deficient* (subnormal) calcification of the teeth, and that the parathyroids normally tend to induce correspondingly *excessive* (supernormal) dental calcification.

New and more elaborate experiments are now required, by these indications, for final determination of the validity of these provisional inferences from our results. The outlook for clear and instructive findings, in such further experiments, is very promising.

6. *Physiological variation* in the composition of the teeth, in rats, is relatively slight and not great enough to account for any of the findings reported in 1914, 1915, and 1916, that were indecisive.

7. The well-known *chemical methods* we have employed in this connection during the past three years were found adequate to detect significant chemical differences in dentition. Various results of uncertain import have not been due, at any time, to deficiencies in the analytic procedures as such.

III.

8. Underlying all our experiments on the effects of internal secretions is the assumption that *chemical* changes may take place, *in developing enamel,* through the influence of substances that *originate* outside of, and enter or superficially affect the cells involved in the production of enamel. If this assumption is *unwarranted,* it is obvious that internal secretions can have no *direct* chemical effect whatever on the production or condition of enamel. If this assumption is incorrect, internal secretions can have, at most, only *indirect* or remote effects on the development of enamel.

9. That our general assumption in this regard is *correct,* however, is shown by the fact that *trypan blue* (a relatively non-toxic pigment), after its intraperitoneal injection into *young* rats, rabbits, and dogs, passes freely into the enamel of *developing* teeth, where the blue pigment seems to remain indefinitely; it does not pass from pulp through dentin into enamel of fully *erupted* teeth. The bearing of these findings on the observations by Black, and by McKay, on "mottled enamel and brown stain" is obvious, and will be discussed in a future paper. (The author is co-operating with Dr. McKay in this relation.)

10. That our general assumption in this regard is justified is shown, also, by the fact that *strontium* (a relatively non-toxic relative of calcium), after its oral administration (as the chlorid) daily for some time to *young* dogs, accumulates in the solid parts (and is present in the pulp) of the first and second sets of teeth, apparently taking the place of calcium. We have not yet determined whether strontium substitutes calcium, in such experiments, in the enamel of fully erupted teeth.

11. Experiments with *arsenic* in the forms of salvarsan and arsenite (analogous to those with strontium), in efforts to determine whether arsenic (a comparatively toxic relative of phosphorus) can displace, or associate with, phosphorus in dental calcification, have given us wholly negative results.

IV.

12. Practically all the results referred to thus far in this report were obtained on teeth *in the process of development.* It was assumed at the beginning, and

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has been cumulatively evident, in these experiments, that internal secretions can have little or no effect, directly or indirectly, *on the enamel of fully developed and erupted teeth* (and therefore can have little or no continuing direct bearing on the problem of caries in such teeth) unless one or more *physiological* substances can pass from pulp through dentin into normal enamel, or from oral fluids into such enamel.[2] There is so much scientific uncertainty on the possibilities in this relation, despite the abundance of comment on the subject, that we concluded at the outset to study these problems from our own particular point of view. Results were presented in our initial report. We have lately added materially to our earlier data in this connection.

13. We find that water passes freely back and forth through all parts, including the enamel, of fully developed natural extracted teeth.

14. Simple mineral salts, such as sodium chlorid, and common organic substances, such as cane sugar, show similar ability to diffuse back and forth through fully developed natural extracted teeth.

15. In future detailed reports we shall publish the data of our numerous experiments on the gain or loss in weight of natural extracted teeth (prior or subsequent to desiccation) after immersion in various neutral media, with special reference to the passage of particular substances of physiological import back and forth through enamel and dentin.

Our results in this general relation indicate that, whether or not there is true nutritive or maintenance *metabolism* in normal enamel, there may be physiological or pathological exchange of materials in enamel by *diffusion* from blood to oral fluids, and *vice versa.*

[2] This statement ignores provisionally the possibility that caries may occur, in some cases, from changes in dentin that merely *undermine* enamel.

v.

16. In the course of our study of the nature of tooth composition, from the point of view of effects of internal secretions on dentition, in their relation to the problems of cause, control, and prevention, of dental caries, we have found that teeth contain a *glyco-protein* that is closely similar to the mucoid Gies discovered in bone, eighteen years ago, and is evidently analogous to, though not the same as, salivary mucin.

A complete study of the properties of this protein substance, which we have named *dento-mucoid,* is now in progress. We have already learned that it remains in teeth during the process of their acid decalcification. It is extractable, from decalcified teeth, with dilute alkalies. It is precipitated from such alkaline extracts by mineral acids, such as hydrochloric. It is an acid protein that forms colloidal salts. It yields reducing substance, similar to aminated glucose, after acidic hydrolysis.

This substance, which probably is localized in the dentin, may bear a significant relation to Kirk's theory pertaining to the availability of fermentable carbohydrate, within teeth, for the nutrition there of bacteria involved in caries.

The discovery of this hitherto unknown constituent of teeth is the most important single finding in our study of dental problems and has made a permanent addition to dental chemistry. We

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are delighted to feel that, as we close our researches under your official auspices, we have the good fortune to announce this discovery to the credit of your society, and to our efforts to serve dental science through your initiative and support.

VI.

17. These researches have been carried to completion with the earnest and effective assistance of Drs. Edgar G. Miller, Jr., Hattie L. Heft, Wm. A. Perlzweig and P. W. Punnett, and Misses Elizabeth C. Franke and Leila Noland.

18. Among the uncompleted researches in this series, now in progress, are studies of the effects, on dentition, in successive generations of rats, (*a*) of treatment with thyroid, (*b*) of unbalanced diets, and (*c*) of toxic malnutrition.

VII.

19. Reference to the work of previous observers in these relations will be published in the detailed descriptions of these several studies.

Note.

THIS SUMMARY OF RESEARCH STUDIES BY DR. WM. J. GIES AND COLLABORATORS FOR 1917 (NO. 5) IS FOLLOWED BY FULL REPORTS OF THE PREVIOUS STUDIES NOS. 3 AND 4, OMITTED FROM THE SOCIETY'S PUBLISHED TRANSACTIONS FOR 1916. (SEE PAGES 112–143)—ED.

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[*See* NOTE, *page 111.*]

Studies of Internal Secretions in Their Relation to the Development and Condition of the Teeth.

By WILLIAM J. GIES and COLLABORATORS.

(*From the Biochemical Laboratory of Columbia University, at the College of Physicians and Surgeons, New York.*)

3. Further Observations on Effects of Feeding Glandular Tissues and Preparations.[1]

By HATTIE L. HEFT, B.S., M.S., A.M.,
ASSISTANT IN BIOLOGICAL CHEMISTRY, COLUMBIA UNIVERSITY.

BEING the first of two sections[2] of the *sixth* annual report, for 1915–16, by William J. Gies and collaborators, on investigations under the auspices of the Research Committee of the Dental Society of the State of New York, Dr. Wm. B. Dunning, chairman; and the first of two sections of the *second* annual report on investigations under the auspices of the Scientific Foundation and Research Commission of the National Dental Association, Dr. Weston A. Price, chairman.

I. Introduction.

The purpose of the experiments described in the preceding paper (2) in this series[3] was indicated in the following introductory statement (p. 162):

> We have aimed, through the agency of "feeding experiments," to ascertain, if possible, the most promising selections of interno-secretory materials for an extended study of dental effects that might be induced by *hyper*secretion in one or more of the ductless glands. This section of our report deals directly with experiments involving the action of "internal secretions" *administered orally*, and covering a comparatively wide range of selections of such factors.

The general outcome of the experiments in this initial inquiry was stated in the following summary (p. 188):

[1] The two preceding papers in this series were published by (1) Morgulis, Perlzweig, and Gies, in the DENTAL COSMOS, 1915, lvii, p. 276, and reprinted in the *Transactions of the Dental Society of the State of New York*, 1914, p. 105; by (2) Miller and Gies, in the *Transactions of the Dental Society of the State of New York*, 1915, p. 161, and abstracted in the *Journal of the Allied Dental Societies*, 1916, xi, p. 47.

[2] The second section of this report (1915–'16) describes experiments on the influence of castration on dentition: Miller and Gies—p. 131.

[3] The first section of our report for 1914–'15.

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Feeding experiments (24) of extended duration (20–99 days), with glandular tissues, preparations and extracts (12 kinds), on white rats (97), yielded results which suggest that possibly the proportions of calcium in both the dry (total solid) and mineral (ash) portions of the incisor teeth were *decreased* by some of the treatments—pineal gland, salivary gland, and thyroid gland, particularly, and *increased* by treatment with testicle.

The results are regarded as suggestive, not as conclusive. *The experiments will be repeated and extended.*

In the present report we describe repetitions of the most suggestive types of the initial experiments.[4]

II. Experimental.

ANTE-MORTEM PROCEDURE.

The experimental procedure described by Miller and Gies (*loc. cit.*, p. 162) was followed in detail.

KINDS OF INTERNO-SECRETORY MATERIALS USED IN THE TESTS. The nature, origin, and condition of the glandular tissues and preparations employed in these experiments are indicated in the following summary.

Lymphatic gland. "Cervical lymphatic glands: desiccated and defatted." Powder. Parke, Davis & Co.: "Research ℞ No. 091,518. (Experiments 1 and 2.)

Pineal gland. "Pineal glands (desiccated)," in 1-grain tablets, each "equivalent to ½ grain of fresh gland." Parke, Davis & Co.: 026,257. (Experiments 11 and 12.)

Salivary gland. Submaxillary glands from oxen. Obtained by us, fresh, in a New York slaughter-house; hashed and kept in a frozen condition. (Experiments 5, 6, 13, and 15.)

Spleen. Spleen from oxen. Obtained by us, fresh, in a New York slaughter-house; hashed and kept in a frozen condition. (Experiments 3 and 4.)

Testicle. Testes from oxen. Obtained by us, fresh, in a New York slaughter-house; hashed and kept in a frozen condition. (Experiments 7, 8, 14, and 16.)

Thyroid gland. "Thyroid glands; desiccated, U.S.P." Powder. "One grain represents 5 grains of fresh thyroid glands." Parke, Davis & Co.: 1,870,-356. (Experiments 9 and 10.)

QUOTATIONS FROM THE PROTOCOLS OF THE EXPERIMENTS. Data bearing significantly on the condition of the rats in each experiment, as the tests proceeded, are summarized below from our records. Unless otherwise indicated below, in the quotations from the protocols, the following statement of *general* facts applies to *all* rats in each experiment:

A. The rats for each experiment were selected from a given litter born in this laboratory—in each case, of a mother in our own "breeding colony." Rats as nearly the same size as possible were taken. (Some of the rats were obtained from the Wistar Institute of Anatomy, some from Miss Abbie Lathrop, of Granby, Mass., as is noted below for each such instance.)

B. Dietary schedule:

Sunday. **Cabbage, cheese.**
Monday. **Corn, meat.**
Tuesday. **Barley, bread.**
Wednesday. **Oats, meat.**
Thursday. **Corn, bread.**
Friday. **Rye, cheese.**
Saturday. **Oats, meat.**

C. Nutritive condition good. Animals hale and hearty.

D. Each group of rats was kept in a suitable cage, where all the living conditions were the same in general for each rat in the group.

[4] For convenience of comparison by the reader, this paper follows very closely the style and arrangement of the paper by Miller and Gies (footnote 1).

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E. Teeth normal in general appearance; length, width, thickness, and curvature not materially affected by the treatment.

F. When a group of rats consisted of representatives of both sexes, it was definitely observed, in each case, that pregnancy had not occurred at any time during the progress of the experiment.

G. At the beginning of each experiment the individual rats of a group were weighed and paired on the basis of approximate equality in weight, one of each pair serving as a "control" rat (C), the other as an "experimental" rat (E). The animals were weighed weekly.

H. The rats were suitably marked with picric acid, excess of which was carefully washed off immediately with water. "Control" rats in a group are designated CA and CB, in the tables; "experimental" rats, EC, ED, EE. In this notation the second letter indicates the individual in its group and subgroup sequences.

I. Immediately after the death of an animal in a group was discovered, an associated C or E rat was chloroformed, so that the "time element" was uniformly the same for all the corresponding C and E rats in a group.

J. At autopsy nothing abnormal was observed.

For the reader's convenience, the *special* data of the experiments are summarized below, from the protocols, in the alphabetic order of the names of the glandular factors involved, the numerals at the heads of the sub-sections indicating the experiments in the order of their inauguration and in their sequence in the arrangement of analytic and other data in Tables 1 and 3.

Lymphatic gland (desiccated). **1.** The rats were received from Miss Lathrop. Four females from a litter of seven were selected for this experiment (two males, CB and EE, were used in Exp. **2.**) The animals, though small, were very active and apparently normal. *Steady gain* in weight throughout. The last portion of available lymphatic material was fed February 28th; the experiment was accordingly discontinued on March 1st. *Autopsy:* Thymus of CA rather large, of ED quite large; thyroid of EC small, of CB normal. *Daily dose:*[5] 0.125 gm. of desiccated and delipined cervical lymphatic gland to January 14th; thereafter, 0.250 gm.

2. In addition to CB and EE from the litter referred to above (1), four more rats, two males and two females, were selected from a litter born at about the same time as the former and also received from Miss Lathrop. The initial weights of the six rats were approximately equal. The notes pertaining to Exp. **1** apply here. (*Autopsy:* No abnormalities.) *Daily dose:* 0.125 gm. of desiccated and delipined cervical lymphatic gland to January 14th; thereafter, 0.250 gm.

Pineal gland (desiccated). **11.** Two males and two females were selected from a litter of seven received from Miss Lathrop. Six weeks after the experiment was started, ED died, and the corresponding control was chloroformed. These rats were replaced by stock rats just their age from a litter of seven. *Steady gain* in weight throughout. *Dosage:* The proper amount of tabular material was placed in a mortar and triturated there with the allotted small amount of meat. Half this mixture was given to the pair of E rats. The residual half portion was allowed to dry in the mortar in which the mixture had been made. Desiccation occurred promptly. On the following day, after moistening it, this residual half portion was administered. This routine was repeated every two days.[6] *Daily dose:* Half a tablet (½ grain) equivalent to ½ grain of fresh gland to December 31st; 1 tablet to January 14th; 2 tablets to January 31st; 3 tablets to February 28th; thereafter, 4 tablets. (Human dose: 1 to 2 grains, equivalent to ½ grain to 1 grain of *fresh* tissue.)

12. Two males and two females were taken from a litter of eight received from Miss Lathrop; they were about the same age as the rats used in Exp. **11.** *Steady gain* in weight throughout. The E rats in each group ate their assignments with unmistakable relish. *Daily dose:* Half a tablet (½ grain)

[5] The figures for "daily dose," in this and all the other experiments, indicate the average daily dose per *treated* (E) rat.

[6] This method of procedure was followed systematically for the experiments in this series that involved the use of *dry* preparations. In the later experiments involving the largest doses, the mixtures were made daily instead of every two days.

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equivalent to ½ grain of fresh gland to December 31st; 1 tablet to January 14th; 2 tablets to January 31st; 3 tablets to February 28th; thereafter, 4 tablets. (Human dose: 1 to 2 grains, equivalent to ½ grain to 1 grain of *fresh* tissue.)

Salivary gland (preserved frozen). **5.** Stock rats. Four females were taken from a litter of seven. The rats were unusually lively and playful. *Daily dose:* 0.5 gm. of fresh salivary gland to January 14th; 1 gm. to February 28th; 3 gm. to March 23d; thereafter, 4 gm.

6. Stock rats. Two males and two females were selected from a litter of five. The rats were a little older at the beginning than those usually selected. The entire group became affected with "ear infection" one month after the experiment was started. Treatment with carbolized vaselin effected temporary relief.[7]

[7] This "infection," our first experience in this connection, came with rats from the large stock at the Wistar Institute of Anatomy, where similar infections have appeared in spite of effective precautionary and disinfective measures against them. Dr. Donaldson of the Wistar Institute informed us that the parasitic organism in these "infections" is one of the itch-mites, *Sarcoptes œlepsis*. The itch-mites burrow in the skin, *S. scabiei* causing in man the disease called itch (scabies). *S. œlepsis* attacks the ears, tail, snout, and other parts of rats—the *tips* of the ears being the usual starting-place. The "infection" causes swelling and disintegration of the outer ears, and thickening and incrustation of the skin on the other parts affected, thick scab formation being conspicuous wherever the parasite infests the surface of the body. When the "infection" is extensive, rats acquire a typical mangy appearance. Subjection of infected rats to several complete immersions, one after the other within a few seconds, in dilute (0.05 per cent.) watery solutions of nicotin, was found by us in this laboratory (subsequent to the completion of these experiments) to completely destroy *all* the parasites on a rat without injuring the host. The nicotin preparation we purchased for this purpose was "a concentrated solution of nicotin-sulfate" containing 40 per cent. of nicotin, called "Black Leaf 40" and manufactured by the Kentucky Tobacco Product Co., Louisville, Ky.

The continued excellent physical condition of the animals indicated that no systemic ill effects had resulted. *Steady gain* in weight throughout. *Daily dose:* 0.5 gm. of fresh salivary gland to January 14th; 1 gm. to February 28th; 3 gm. to March 23d; thereafter, 4 gm.

13. It was necessary to use rats from two litters. Males were selected. CA and EC were taken from a litter of eight, born in this laboratory of a Wistar Institute mother. CB′ and ED′ were from a litter of nine, also of Wistar Institute parentage (two other males from this litter were used, as CB′ and ED′, in Exp. **14.**) *Steady gain* in weight throughout. *Daily dose:* 0.5 gm. of fresh salivary gland to January 14th; 1 gm. to February 28th; 3 gm. to March 23d; thereafter, 4 gm.

15. Two male rats, born of a Wistar Institute mother, were taken from a litter of eight. (A pair of stock rats which had been included died a few days after the experiment was started, when it was too late to make further suitable additions to this group, because of lack of available young rats.) *Steady gain* in weight throughout. Twice during the experiment the recorded weights of the rats were identical, but at the close of the experiment ED showed a relative increase of 31.4 per cent. *Daily dose:* 0.5 gm. of fresh salivary gland to January 14th; 1 gm. to February 28th; 3 gm. to March 23d; thereafter, 4 gm.

Spleen (preserved frozen). **3.** The rats, a litter of two males and two females, were received from Miss Lathrop. They seemed undersized though well proportioned, and were relatively inactive. Constant difficulty was experienced in getting the rats to partake of the spleen. Various plans were adopted to stimulate their appetites, such as offering spleen on alternate days and mixing it thoroughly with meat to improve odor and taste. At times these methods were effective, and again they were not. Toward the latter part of the experiment, spleen was offered daily and eaten, though slowly and with evident lack of relish. On one occasion *fresh* spleen, taken from a dog just killed, was offered, and eaten with avidity. *Steady gain* in weight throughout. *Daily dose:* 0.5 gm. of fresh spleen to January 14th; 1 gm. to February 28th; 1.5 gm. to March 21st; thereafter, 2 gm.

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TABLE 1.—DATA PERTAINING TO EFFECTS ON THE BODY-WEIGHTS OF THE RATS. (*See Table 2.*)

Exp. No.	Rat sub-group.	Sex of rat.	Glandular material ingested.[2]	Date of birth of rat.	Date of beginning of experiment.	Date of ending of experiment.	Age of rat at death.	Duration of the experiment.	Weight of rat.		
									Beginning of experiment.	End of experiment.	Gain.
				1915.	1915.	1916.	days.	days.	grams.	grams.	grams.
1	CA[1]	♀♀♀♀	. . .	Nov. 15	Dec. 4	Mar. 1	107	88	13.5	73.0	59.5
	CB		" 15	" 4	" 1	107	88	16.5	102.0	85.5	
	EC[1]		Lymphatic	" 15	" 4	" 1	107	88	14.5	59.5	45.0
	ED		"	" 15	" 4	" 1	107	88	15.5	81.5	66.0
2	CA	♂♂♀♀	. . .	Nov. 15	Dec. 4	Mar. 1	107	88	16.0	98.0	82.0
	CB		. . .	" 15	" 4	Feb. 7	84	65	16.0	32.0	16.0
	CC		. . .	" 15	" 4	Mar. 1	107	88	16.0	75.0	59.0
	ED		Lymphatic	" 15	" 4	" 1	107	88	16.0	93.0	77.0
	EE		"	" 15	" 4	Feb. 7	84	65	16.5	50.0	33.5
	EF		"	" 15	" 4	Mar. 1	107	88	17.0	94.0	77.0
3	CA	♀♂♀♂	. . .	Nov. 18	Dec. 10	Mar. 29	132	110	16.0	81.0	65.0
	CB		" 18	" 10	" 29	132	110	16.0	88.0	72.0	
	EC		Spleen	" 18	" 10	" 29	132	110	15.5	98.0	82.5
	ED		"	" 18	" 10	" 29	132	110	17.0	82.0	65.0
4	CA	♀♂♂♀	. . .	Dec. 1	Dec. 21	Apr. 3	124	104	19.0	105.0	86.0
	CB		. . .	" 1	" 21	Feb. 14	75	55	15 0	30.0	15.0
	CC		. . .	" 1	" 21	Apr. 3	124	104	17.5	112.0	94.5
	ED		Spleen	" 1	" 21	" 3	124	104	17.5	78.0	60.5
	EE		"	" 1	" 21	Feb. 14	75	55	15.5	42.5	27.0
	EF		"	" 1	" 21	Apr. 3	124	104	19.5	134.0	114.5
5	CA	♀♀♀♀	. . .	Nov. 25	Dec. 13	Mar. 8	104	86	18.0	63.0	45.0
	CB		. . .	" 25	" 13	Apr. 4	131	113	17.5	139.0	121.5
	EC		Salivary	" 25	" 13	Mar. 8	104	86	18.0	96.0	78.0
	ED		"	" 25	" 13	Apr. 4	131	113	17.5	141.0	123.5
6	CA	♂♂♂♂	. . .	Nov. 19	Dec. 13	Apr. 12	145	121	33.0	120.0	87.0
	CB		. .	" 19	" 13	" 13	146	122	32.0	138.0	106.0
	EC		Salivary	" 19	" 13	" 12	145	121	30.0	160.0	130.0
	ED		"	" 19	" 13	" 13	146	122	33.5	135.0	101.5
7	CA	♂♂♂♂		Nov. 28	Dec. 16	Apr. 5	129	111	25.0	125.0	100.0
	CB		. .	" 28	" 16	" 5	129	111	24.0	105.0	81.0
	EC		Testicle	" 28	" 16	" 5	129	111	25.0	115.0	90.0
	ED		"	" 28	" 16	" 5	129	111	21.5	115.0	93.5

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8	CA	♂	. . .	Nov. 28	Dec. 16	Apr. 5	129	111	18.0	105.0	87.0
	CB	♂	. . .	" 28	" 16	" 5	129	111	18.5	125.0	106.5
	CC	♂	. . .	" 28	" 16	" 5	129	111	17.0	97.0	80.0
	ED	♂	Testicle	" 28	" 16	" 5	129	111	18.0	96.0	78.0
	EE	♂	"	" 28	" 16	" 5	129	111	18.5	96.0	77.5
	EF	♂	"	" 28	" 16	" 5	129	111	17.5	87.0	69.5
9	CA	♀	. . .	Nov. 28	Dec. 18	Apr. 10	134	114	16.5	140.0	123.5
	CB	♀	. . .	Dec. 15	Jan. 24	Feb. 21	68	28	30.0	40.0	10.0
	EC	♀	Thyroid	Nov. 28	Dec. 18	Apr. 10	134	114	14.0	112.0	98.0
	ED	♀	"	Dec. 15	Jan. 24	Feb. 21	68	28	30.0	21.0	—9.0
10	CA	♂	. . .	Nov. 28	Dec. 18	Apr. 10	134	114	15.0	142.0	127.0
	CB	♂	. . .	Dec. 15	Jan. 24	Feb. 21	68	28	36.0	42.0	6.0
	EC	♂	Thyroid	Nov. 28	Dec. 18	Apr. 10	134	114	15.5	78.0	62.5
	ED	♂	"	Dec. 15	Jan. 24	Feb. 21	68	28	39.0	24.0	—15.0
11	CA	♀	. . .	Nov. 28	Dec. 19	Apr. 7	131	110	19.0	86.0	67.0
	CB	♀	. . .	" 28	" 19	Jan. 31	64	43	19.5	39.0	19.5
	CB′	♀	. . .	" 25	Feb. 1	Apr. 7	134	66	37.0	112.0	75.0
	EC	♀	Pineal	" 28	Dec. 19	" 7	131	110	19.0	104.0	85.0
	ED	♀	"	" 28	" 19	Jan. 31	64	43	18.5	31.0	12.5
	ED′	♀	"	" 25	Feb. 1	Apr. 7	134	66	37.0	98.0	61.0
12	CA	♀	. . .	Nov. 28	Dec. 19	Apr. 8	132	111	18.0	108.0	90.0
	CB	♀	. . .	" 28	" 19	" 8	132	111	18.0	100.0	82.0
	EC	♀	Pineal	" 28	" 19	" 8	132	111	18.5	142.0	123.5
	ED	♀	"	" 28	" 19	" 8	132	111	17.0	97.0	80.0
13	CA	♂	. . .	Dec. 3	Dec. 21	Apr. 12	131	113	23.0	168.0	145.0
	CB′	♂	. . .	" 7	" 23	" 12	127	111	19.0	142.0	123.0
	EC	♂	Salivary	" 3	" 21	" 12	131	113	22.5	182.0	159.5
	ED′	♂	"	" 7	" 23	" 12	127	111	19.5	155.0	135.5
14	CB′	♂	. . .	Dec. 7	Dec. 23	Apr. 12	127	111	20.0	188.0	168.0
	ED′	♂	Testicle	" 7	" 23	" 12	127	111	20.5	205.0	184.5
15	CB	♂		Dec. 15	Jan. 3	Apr. 12	119	100	23.5	156.0	132.5
	ED	♂	Salivary	" 15	" 3	" 12	119	100	24.0	205.0	181.0
16	CB	♂	. .	Dec. 10	Jan. 3	Apr. 12	124	100	20.0	105.0	85.0
	ED	♂	Testicle	" 10	" 3	" 12	124	100	21.5	168.0	146.5

[1] C rats are "control" ones—A (1) and B (2); E rats are "experimental," i.e. *treated*, animals—C (3), D (4), E (5).

[2] See summary of details regarding glandular materials used, page 113.

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TABLE 1.—DATA PERTAINING TO EFFECTS ON THE BODY-WEIGHTS OF THE RATS. (*See Table 2.*)

Exp. No.	Rat sub-group.	Sex of rat.	Glandular material ingested.[2]	Date of birth of rat.	Date of beginning of experiment.	Date of ending of experiment.	Age of rat at death.	Duration of the experiment.	Weight of rat.		
									Beginning of experiment.	End of experiment.	Gain.
				1915.	1915.	1916.	days.	days.	grams.	grams.	grams.
1	CA[1]	♀♀♀♀♀	. . .	Nov. 15	Dec. 4	Mar. 1	107	88	13.5	73.0	59.5
	CB			" 15	" 4	" 1	107	88	16.5	102.0	85.5
	EC[1]		Lymphatic	" 15	" 4	" 1	107	88	14.5	59.5	45.0
	ED		"	" 15	" 4	" 1	107	88	15.5	81.5	66.0
2	CA	♂♂♂♂♂	. . .	Nov. 15	Dec. 4	Mar. 1	107	88	16.0	98.0	82.0
	CB		. . .	" 15	" 4	Feb. 7	84	65	16.0	32.0	16.0
	CC		. . .	" 15	" 4	Mar. 1	107	88	16.0	75.0	59.0
	ED		Lymphatic	" 15	" 4	" 1	107	88	16.0	93.0	77.0
	EE		"	" 15	" 4	Feb. 7	84	65	16.5	50.0	33.5
	EF		"	" 15	" 4	Mar. 1	107	88	17.0	94.0	77.0
3	CA	♀♂♀♂♂	. . .	Nov. 18	Dec. 10	Mar. 29	132	110	16.0	81.0	65.0
	CB			" 18	" 10	" 29	132	110	16.0	88.0	72.0
	EC		Spleen	" 18	" 10	" 29	132	110	15.5	98.0	82.5
	ED		"	" 18	" 10	" 29	132	110	17.0	82.0	65.0
4	CA	♂♀♂♀♂	. . .	Dec. 1	Dec. 21	Apr. 3	124	104	19.0	105.0	86.0
	CB		. . .	" 1	" 21	Feb. 14	75	55	15 0	30.0	15.0
	CC		. . .	" 1	" 21	Apr. 3	124	104	17.5	112.0	94.5
	ED		Spleen	" 1	" 21	" 3	124	104	17.5	78.0	60.5
	EE		"	" 1	" 21	Feb. 14	75	55	15.5	42.5	27.0
	EF		"	" 1	" 21	Apr. 3	124	104	19.5	134.0	114.5
5	CA	♀♀♀♀♀	. . .	Nov. 25	Dec. 13	Mar. 8	104	86	18.0	63.0	45.0
	CB		. . .	" 25	" 13	Apr. 4	131	113	17.5	139.0	121.5
	EC		Salivary	" 25	" 13	Mar. 8	104	86	18.0	96.0	78.0
	ED		"	" 25	" 13	Apr. 4	131	113	17.5	141.0	123.5
6	CA	♀♂♂♂♂	. . .	Nov. 19	Dec. 13	Apr. 12	145	121	33.0	120.0	87.0
	CB		. . .	" 19	" 13	" 13	146	122	32.0	138.0	106.0
	EC		Salivary	" 19	" 13	" 12	145	121	30.0	160.0	130.0
	ED		"	" 19	" 13	" 13	146	122	33.5	135.0	101.5
7	CA	♂♂♂♂♂	. . .	Nov. 28	Dec. 16	Apr. 5	129	111	25.0	125.0	100.0
	CB		. . .	" 28	" 16	" 5	129	111	24.0	105.0	81.0
	EC		Testicle	" 28	" 16	" 5	129	111	25.0	115.0	90.0
	ED		"	" 28	" 16	" 5	129	111	21.5	115.0	93.5

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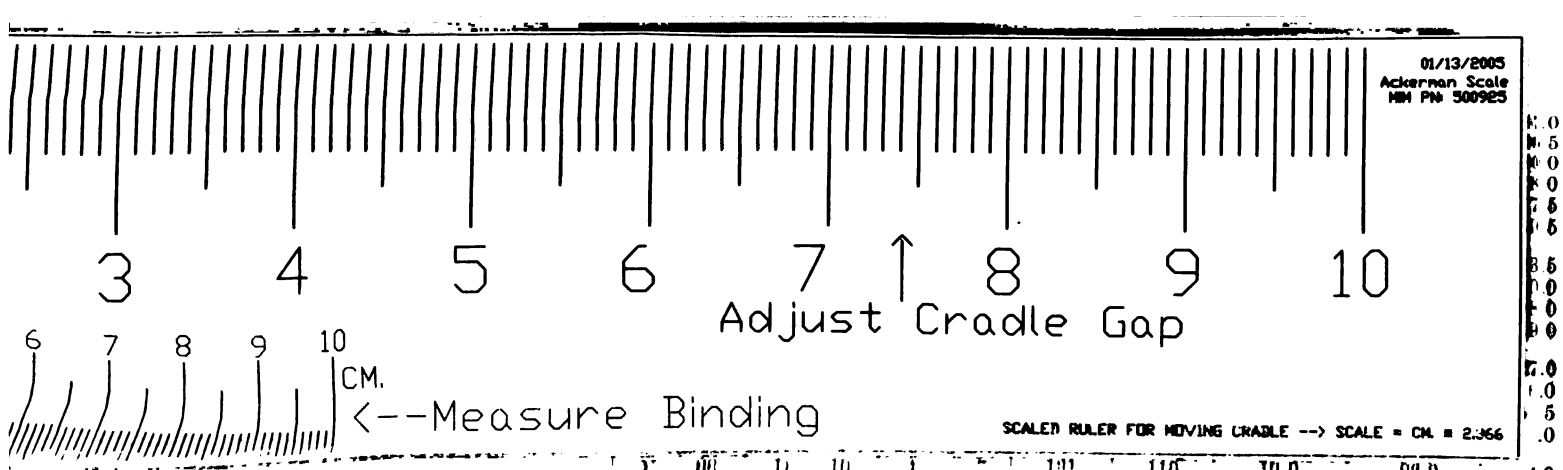

	CB	♀♀♀♀♀	. . .	" 28	" 19	Jan. 31	64	43	19.5	39.0	19.5
	CB′	♀♀♀♀♀	. . .	" 25	Feb. 1	Apr. 7	134	66	37.0	112.0	75.0
	EC	♀♀♀♀♀	Pineal	" 28	Dec. 19	" 7	131	110	19.0	104.0	85.0
	ED	♀♀♀♀♀	"	" 28	" 19	Jan. 31	64	43	18.5	31.0	12.5
	ED′	♀♀♀♀♀	"	" 25	Feb. 1	Apr. 7	134	66	37.0	98.0	61.0
12	CA	♂♂♀♂♀	. . .	Nov. 28	Dec. 19	Apr. 8	132	111	18.0	108.0	90.0
	CB	♂♂♀♂♀	. . .	" 28	" 19	" 8	132	111	18.0	100.0	82.0
	EC	♂♂♀♂♀	Pineal	" 28	" 19	" 8	132	111	18.5	142.0	123.5
	ED	♂♂♀♂♀	"	" 28	" 19	" 8	132	111	17.0	97.0	80.0
13	CA	♂♂♂♂♂	. . .	Dec. 3	Dec. 21	Apr. 12	131	113	23.0	168.0	145.0
	CB′	♂♂♂♂♂	. . .	" 7	" 23	" 12	127	111	19.0	142.0	123.0
	EC	♂♂♂♂♂	Salivary	" 3	" 21	" 12	131	113	22.5	182.0	159.5
	ED′	♂♂♂♂♂	"	" 7	" 23	" 12	127	111	19.5	155.0	135.5
14	CB′	♂♂♂	. . .	Dec. 7	Dec. 23	Apr. 12	127	111	20.0	188.0	168.0
	ED′	♂♂♂	Testicle	" 7	" 23	" 12	127	111	20.5	205.0	184.5
15	CB	♂♂♂		Dec. 15	Jan. 3	Apr. 12	119	100	23.5	156.0	132.5
	ED	♂♂♂	Salivary	" 15	" 3	" 12	119	100	24.0	205.0	181.0
16	CB	♂♂♂		Dec. 10	Jan. 3	Apr. 12	124	100	20.0	105.0	85.0
	ED	♂♂♂	Testicle	" 10	" 3	" 12	124	100	21.5	168.0	146.5

[1] C rats are "control" ones—A (1) and B (2); E rats are "experimental," i.e. *treated*, animals—C (3), D (4), E (5).
[2] See summary of details regarding glandular materials used, page 113.

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TABLE 1.—DATA PERTAINING TO EFFECTS ON THE BODY-WEIGHTS OF THE RATS. (*See Table 2.*)

Exp. No.	Rat sub-group.	Sex of rat.	Glandular material ingested.[2]	Date of birth of rat.	Date of beginning of experiment.	Date of ending of experiment.	Age of rat at death.	Duration of the experiment.	Weight of rat.		
									Beginning of experiment.	End of experiment.	Gain.
				1915.	1915.	1916.	days.	days.	grams.	grams.	grams.
1	CA[1]	♀+♀+♀+♀+	. . .	Nov. 15	Dec. 4	Mar. 1	107	88	13.5	73.0	59.5
	CB		" 15	" 4	" 1	107	88	16.5	102.0	85.5
	EC[1]		Lymphatic	" 15	" 4	" 1	107	88	14.5	59.5	45.0
	ED		"	" 15	" 4	" 1	107	88	15.5	81.5	66.0
2	CA	♂+♂+♂+♂+	. . .	Nov. 15	Dec. 4	Mar. 1	107	88	16.0	98.0	82.0
	CB		. . .	" 15	" 4	Feb. 7	84	65	16.0	32.0	16.0
	CC		. . .	" 15	" 4	Mar. 1	107	88	16.0	75.0	59.0
	ED		Lymphatic	" 15	" 4	" 1	107	88	16.0	93.0	77.0
	EE		"	" 15	" 4	Feb. 7	84	65	16.5	50.0	33.5
	EF		"	" 15	" 4	Mar. 1	107	88	17.0	94.0	77.0
3	CA	♀+♂+♂+♂	. . .	Nov. 18	Dec. 10	Mar. 29	132	110	16.0	81.0	65.0
	CB		" 18	" 10	" 29	132	110	16.0	88.0	72.0
	EC		Spleen	" 18	" 10	" 29	132	110	15.5	98.0	82.5
	ED		"	" 18	" 10	" 29	132	110	17.0	82.0	65.0
4	CA	♀+♂+♂+♂+♂	. . .	Dec. 1	Dec. 21	Apr. 3	124	104	19.0	105.0	86.0
	CB		. . .	" 1	" 21	Feb. 14	75	55	15 0	30.0	15.0
	CC		. . .	" 1	" 21	Apr. 3	124	104	17.5	112.0	94.5
	ED		Spleen	" 1	" 21	" 3	124	104	17.5	78.0	60.5
	EE		"	" 1	" 21	Feb. 14	75	55	15.5	42.5	27.0
	EF		"	" 1	" 21	Apr. 3	124	104	19.5	134.0	114.5
5	CA	♀+♀+♀+♀+	. . .	Nov. 25	Dec. 13	Mar. 8	104	86	18.0	63.0	45.0
	CB		. . .	" 25	" 13	Apr. 4	131	113	17.5	139.0	121.5
	EC		Salivary	" 25	" 13	Mar. 8	104	86	18.0	96.0	78.0
	ED		"	" 25	" 13	Apr. 4	131	113	17.5	141.0	123.5
6	CA	♀+♂+♂+♂	. . .	Nov. 19	Dec. 13	Apr. 12	145	121	33.0	120.0	87.0
	CB		. . .	" 19	" 13	" 13	146	122	32.0	138.0	106.0
	EC		Salivary	" 19	" 13	" 12	145	121	30.0	160.0	130.0
	ED		"	" 19	" 13	" 13	146	122	33.5	135.0	101.5
7	CA	♂+♂+♂+♂	. . .	Nov. 28	Dec. 16	Apr. 5	129	111	25.0	125.0	100.0
	CB		. . .	" 28	" 16	" 5	129	111	24.0	105.0	81.0
	EC		Testicle	" 28	" 16	" 5	129	111	25.0	115.0	90.0
	ED		"	" 28	" 16	" 5	129	111	21.5	115.0	93.5

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8	CA	♂♂♂♂♂	. . .	Nov.	28	Dec.	16	Apr.	5	129	111	18.0	105.0	87.0
	CB		. . .	"	28	"	16	"	5	129	111	18.5	125.0	106.5
	CC		. . .	"	28	"	16	"	5	129	111	17.0	97.0	80.0
	ED		Testicle	"	28	"	16	"	5	129	111	18.0	96.0	78.0
	EE		"	"	28	"	16	"	5	129	111	18.5	96.0	77.5
	EF		"	"	28	"	16	"	5	129	111	17.5	87.0	69.5
9	CA	♂+♂+♂+♂+	. . .	Nov.	28	Dec.	18	Apr.	10	134	114	16.5	140.0	123.5
	CB		. . .	Dec.	15	Jan.	24	Feb.	21	68	28	30.0	40.0	10.0
	EC		Thyroid	Nov.	28	Dec.	18	Apr.	10	134	114	14.0	112.0	98.0
	ED		"	Dec.	15	Jan.	24	Feb.	21	68	28	30.0	21.0	—9.0
10	CA	♂♂♂♂♂	. . .	Nov.	28	Dec.	18	Apr.	10	134	114	15.0	142.0	127.0
	CB		. . .	Dec.	15	Jan.	24	Feb.	21	68	28	36.0	42.0	6.0
	EC		Thyroid	Nov.	28	Dec.	18	Apr.	10	134	114	15.5	78.0	62.5
	ED		"	Dec.	15	Jan.	24	Feb.	21	68	28	39.0	24.0	—15.0
11	CA	♂+♂+♂+♂+♂	. . .	Nov.	28	Dec.	19	Apr.	7	131	110	19.0	86.0	67.0
	CB		. . .	"	28	"	19	Jan.	31	64	43	19.5	39.0	19.5
	CB′		. . .	"	25	Feb.	1	Apr.	7	134	66	37.0	112.0	75.0
	EC		Pineal	"	28	Dec.	19	"	7	131	110	19.0	104.0	85.0
	ED		"	"	28	"	19	Jan.	31	64	43	18.5	31.0	12.5
	ED′		"	"	25	Feb.	1	Apr.	7	134	66	37.0	98.0	61.0
12	CA	♂+♂+♂+♂+	. . .	Nov.	28	Dec.	19	Apr.	8	132	111	18.0	108.0	90.0
	CB		. . .	"	28	"	19	"	8	132	111	18.0	100.0	82.0
	EC		Pineal	"	28	"	19	"	8	132	111	18.5	142.0	123.5
	ED		"	"	28	"	19	"	8	132	111	17.0	97.0	80.0
13	CA	♂♂♂♂♂	. . .	Dec.	3	Dec.	21	Apr.	12	131	113	23.0	168.0	145.0
	CB′		. . .	"	7	"	23	"	12	127	111	19.0	142.0	123.0
	EC		Salivary	"	3	"	21	"	12	131	113	22.5	182.0	159.5
	ED′		"	"	7	"	23	"	12	127	111	19.5	155.0	135.5
14	CB′	♂♂	. . .	Dec.	7	Dec.	23	Apr.	12	127	111	20.0	188.0	168.0
	ED′		Testicle	"	7	"	23	"	12	127	111	20.5	205.0	184.5
15	CB	♂♂	. .	Dec.	15	Jan.	3	Apr.	12	119	100	23.5	156.0	132.5
	ED		Salivary	"	15	"	3	"	12	119	100	24.0	205.0	181.0
16	CB	♂♂	. .	Dec.	10	Jan.	3	Apr.	12	124	100	20.0	105.0	85.0
	ED		Testicle	"	10	"	3	"	12	124	100	21.5	168.0	146.5

[1] C rats are "control" ones—A (1) and B (2); E rats are "experimental," i.e. *treated*, animals—C (3), D (4), E (5).
[2] See summary of details regarding glandular materials used, page 113.

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TABLE 2.—DATA PERTAINING TO THE BODY-WEIGHT BALANCES FOR THE SUB-GROUPS OF RATS. (*See Table 1.*)

Exp. No.	Sex of rats.	Granular material ingested.	Gross weights of the rats at the ends of the experiments.				Gains in weight during the experiments.			
			C[1]	E[1]	Balance. C > E	Balance. E > C	C	E	Balance. C > E	Balance. E > C
			grams.	grams.	grams.	grams.	grams.	grams.	grams.	grams.
1	♀	Lymphatic	175.0	141.0	34.0	. .	145.0	111.0	34.0	. .
2	♂♀	"	205.0	237.0	. .	32.0	157.0	187.5	. .	30.5
11	♂♀	Pineal	237.0	233.0	4.0	. .	161.5	158.5	3.0	. .
12	♂♀	"	208.0	239.0	. .	31.0	172.0	203.5	. .	31.5
5	♀	Salivary	202.0	237.0	. .	35.0	166.5	201.5	. .	35.0
6	♂♀	"	258.0	295.0	. .	37.0	193.0	231.5	. .	38.5
13	♂♂	"	310.0	337.0	. .	27.0	268.0	295.0	. .	27.0
15	♂♂	"	156.0	205.0	. .	49.0	132.5	181.0	. .	48.5
3	♂♀	Spleen	169.0	180.0	. .	11.0	137.0	147.5	. .	10.5
4	♂♀	"	247.0	254.5	. .	7.5	195.5	202.0	. .	6.5
7	♂	Testicle	230.0	230.0	. .	. .	181.0	183.5	. .	2.5
8	♂	"	327.0	279.0	48.0	. .	278.5	225.0	48.5	. .
14	♂	"	188.0	205.0	. .	17.0	168.0	184.5	. .	16.5
16	♂	"	105.0	168.0	. .	63.0	85.0	146.5	. .	61.5
9	♀	Thyroid	180.0	133.0	47.0	. .	133.5	89.0	44.5	. .
10	♂	"	184.0	102.0	82.0	. .	133.0	47.5	85.5	. .

[1] C rats are "control" ones—A (1) and B (2); E rats are "experimental," i.e. *treated*, animals—C (3), D (4), E (5).

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4. Four females and two males were taken from a litter of eight, born of a Wistar Institute mother. The E rats ate the spleen without hesitation and with apparent relish. *Steady gain* in weight throughout. *Daily dose:* 0.5 gm. of fresh spleen to January 14th; 1 gm. to February 28th; 1.5 gm. to March 21st; thereafter, 2 gm.

Testicle (preserved frozen). **7.** A litter of four, all males, born of a Wistar Institute mother, was used. *Steady gain* in weight throughout. The E rats were exactly the same weight when the experiment closed. *Daily dose:* 0.5 gm. of fresh testicle to January 14th; 1 gm. to February 28th; 2 gm. to March 22d; thereafter, 4 gm.

8. Six males were taken from a litter of seven, the mother of which was received from the Wistar Institute. The group was especially lively and playful, and continued so to the end of the experiment. *Steady gain* in weight throughout. *Daily dose:* 0.5 gm. of fresh testicle to January 14th; 1 gm. to February 28th; 2 gm. to March 22d; thereafter, 4 gm.

14. This test was conducted with four males: CA and EC were from a litter of eight born of a Wistar Institute mother; CB and ED were from a litter of nine (stock rats). As the latter were much younger and smaller, they were removed soon after the beginning of the test, and two others, CB′ and ED′, also Wistar Institute animals from a litter of nine, were substituted. Two other males from the latter litter were used as CB′ and ED′ in Exp. **13.** EC died and was devoured by his fellows, thus leaving three animals. It was then decided to discard CA and to rely upon the comparative data for CB′ and ED′. These were unusually large and healthy animals. *Steady gain* in weight throughout. *Daily dose:* 0.5 gm. of fresh testicle to January 14th; 1 gm. to February 28th; 2 gm. to March 22d; thereafter, 4 gm.

16. This test was started with four males born of a Wistar Institute mother. Two died soon after the beginning of the experiment. These were replaced with two males from a stock litter, but they, too, died soon afterward. As no other young rats were available, we continued with CB and ED. *Steady gain* in weight throughout. *Daily dose:* 0.5 gm. of fresh testicle to January 14th; 1 gm. to February 28th; 2 gm. to March 22d; thereafter, 4 gm.

Thyroid (desiccated). **9.** Four females were taken from a litter of seven stock rats. Two weeks later, upon the death of ED, two rats (EC′ and ED′) from a litter of eight, the brothers of which were used in Expts. **15** and **16,** replaced EC and ED; ED′ died two weeks later. Rats suitable for substitution were not available, but the experiment was continued with the two survivors. EC did not manifest the pronounced emaciation characteristic of thyroid-fed animals. *Daily dose:* 0.125 gm. of desiccated thyroid gland (equivalent to 0.625 gm. of fresh tissue) to January 14th; 0.150 gm. to February 28th; 0.175 gm. to March 21st; thereafter, 0.200 gm. (Human dose: 0.13 gm. to 0.33 gm., thrice daily.)

10. Four males were selected from a litter of eight received from Miss Lathrop. ED died two weeks later, and a pair of Wistar Institute animals, from a litter of eight, was substituted. Males from this litter were used in Expts. **15** and **16.** Rat ED′ lived only two weeks. Two males from a litter of four stock rats, comparable to the survivors, were then added to the group. Two females from this litter were used in Exp. **9** as CB′ and ED′. EC manifested *decided* emaciation. *Daily dose:* 0.125 gm. of desiccated thyroid gland (equivalent to 0.625 gm. of fresh tissue) to January 14th; 0.150 gm. to February 28th; 0.175 gm. to March 21st; thereafter, 0.200 gm. (Human dose: 0.13 gm. to 0.33 gm., thrice daily.)

GENERAL POST-MORTEM PROCEDURE RELATING TO THE INCISOR TEETH. At the conclusion of each experiment the incisor teeth were obtained and prepared for analysis by the procedure described by Miller and Gies (*loc. cit.,* p. 169).

ANALYTIC METHODS APPLIED TO THE INCISOR TEETH. The prepared teeth were analyzed by the methods described by Miller and Gies (*loc. cit.,* p. 173).

ANALYTIC RESULTS AND OTHER DATA. In the accompanying table (Table 1) we present our data pertaining to the sex, age, weight, and number of the rats; th-

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TABLE 3.—DATA PERTAINING TO EFFECTS ON THE WEIGHTS AND GENERAL COMPOSITION OF THE INCISOR TEETH OF THE RATS.
(*See Tables 1, 4 and 5.*)

Exp. No.	Rat. Sub-groups.	Rat. Sex.	Rat. Glandular material ingested.[1]	Teeth. Weight. Dry.	Ash.	Organic.	Per cent. of dry weight. Ash.	Organic.	Calcium. Per cent. of dry weight.	Per cent. of ash.
1	CA[2]	♀	. . .	153.8	110.0	43.8	71.52	28.48	25.47	34.99
	CB	♀	. . .	183.4	135.4	48.0	73.83	26.17		
	EC[2]	♀	Lymphatic	142.6	103.0	39.6	72.23	27.77	24.82	34.35
	ED	♀	"	154.5	111.9	42.6	72.43	27.57		
2	CA	♂	. . .	141.8	101.0	40.8	71.22	28.78		
	CB	♂	. . .	116.8	79.4	37.4	67.98	32.02	25.71	36.20
	CC	♂	. . .	151.0	110.5	40.5	73.18	26.82		
	ED	♂	Lymphatic	165.6	122.4	43.2	73.91	26.09		
	EE	♂	"	116.3	81.0	35.3	69.65	30.35	25.47	35.50
	EF	♂	"	154.5	109.6	44.9	70.94	29.06		
3	CA	♂	. . .	152.4	108.7	43.7	71.32	28.68	25.24	35.10
	CB	♂	. . .	164.9	119.4	45.5	72.41	27.59		
	EC	♂	Spleen	140.5	99.5	41.0	70.82	29.18	25.43	36.06
	ED	♂	"	145.6	102.2	43.4	70.19	29.81		
4	CA	♀	. . .	133.8	94.7	39.1	70.77	29.23		
	CB	♀	. . .	106.1	77.2	28.9	72.76	27.24	25.40	35.00
	CC	♀	. . .	168.4	124.4	44.0	73.87	26.13		
	ED	♀	Spleen	139.6	101.4	38.2	72.64	27.36		
	EE	♂	"	108.8	72.7	31.1	70.04	29.96	23.89	33.23
	EF	♂	"	159.2	115.4	43.8	72.42	27.58		
5	CA	♀	. . .	172.3	130.5	41.8	75.74	24.26	25.87	34.50
	CB	♀	. . .	152.9	113.4	39.5	74.17	25.83		
	EC	♀	Salivary	171.2	127.3	43.9	74.36	25.64	24.74	33.44
	ED	♀	"	146.4	107.6	38.8	73.49	26.51		
6	CA	♀	. . .	153.4	110.6	42.8	72.09	27.91	24.76	33.77
	CB	♀	. . .	162.4	121.0	41.4	74.51	25.49		
	EC	♂	Salivary	212.7	160.9	51.8	75.65	24.35	24.76	32.97
	EC	♂	"	174.1	129.6	44.5	74.44	25.56		

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7	CA	♂♂♂♂♂	. . .	173.0	125.6	47.4	72.60	27.40	24.60	33.72
	CB		. . .	175.4	128.6	46.8	73.32	26.68		
	EC		Testicle	142.4	103.8	38.6	72.89	27.11	25.92	35.13
	ED		"	151.6	113.1	38.5	74.60	25.40		
8	CA	♂♂♂♂♂♂♂♂♂	. . .	156.6	112.6	44.0	71.90	28.10	25.57	34.75
	CB		. . .	167.6	123.6	44.0	73.75	26.25		
	CC		. . .	183.2	137.2	46.0	74.89	25.11		
	ED		Testicle	140.4	100.6	39.8	71.65	28.35	26.87	37.59
	EE		"	149.6	107.0	42.6	71.53	28.47		
	EF		"	139.8	99.6	40.2	71.25	28.75		
9	CA	♀♀♀♀♀	. . .	218.1	166.6	51.5	76.39	23.61	29.73	39.93
	CB		. . .	71.5	49.0	22.5	68.53	31.47		
	EC		Thyroid	166.2	126.4	39.8	76.05	23.95	29.08	39.88
	ED		"	84.1	58.1	26.0	69.09	30.91		
10	CA	♂♂♂♂♂	. . .	213.4	162.0	51.4	75.91	24.09	28.56	38.52
	CB		. . .	69.0	47.4	21.6	68.69	31.31		
	EC		Thyroid	189.3	145.7	43.6	76.97	23.03	28.19	38.06
	ED		"	79.6	53.5	26.1	67.21	32.79		
11	CA	♀♀♀♀♀♀♀♀♀	. . .	186.8	142.7	44.1	76.39	23.61	26.87	36.70
	CB		. . .	90.0	62.6	27.4	69.55	30.44		
	CB′		. . .	135.8	96.7	39.1	71.21	28.79		
	EC		Pineal	176.7	133.6	43.1	75.61	24.39	26.93	36.09
	ED		"	122.7	91.5	31.2	74.57	25.43		
	ED′		"	119.1	87.2	31.9	73.21	26.79		
12	CA	♂♂♂♂♂	. . .	157.0	117.6	39.4	74.90	25.10	28.35	37.19
	CB		. . .	171.4	132.7	38.7	77.42	22.58		
	EC		Pineal	172.2	128.6	43.6	74.68	25.32	28.79	39.04
	ED		"	137.7	99.9	37.8	72.55	27.45		
13	CA	♂♂♂♂♂	. . .	183.3	136.7	46.6	74.58	25.42	27.58	36.84
	CB′		. . .	231.9	177.8	54.1	76.67	23.33		
	EC		Salivary	211.2	156.8	54.4	74.24	25.76	26.49	35.41
	ED′		"	222.2	167.4	54.8	75.34	24.66		
14	CB′	♂♂	. .	248.6	191.4	57.2	76.99	23.01	28.74	37.31
	ED′		Testicle	180.8	133.1	47.7	73.62	26.38	28.69	38.97
15	CB	♂♂	. . .	212.3	163.4	48.9	76.97	23.03	28.66	37.24
	ED		Salivary	214.0	164.8	49.2	77.01	22.99	26.78	34.77
16	CB	♂♂	. .	125.0	90.8	34.2	72.64	27.36	27.10	37.29
	ED		Testicle	167.5	122.4	45.1	73.07	26.93	28.31	38.73

[1] See summary of details regarding glandular materials used, page 113.

[2] C rats are "control" ones—A (1) and B (2); E rats are "experimental," i.e. *treated*, animals—C (3), D (4), E (5).

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TABLE 4.—DATA PERTAINING TO EFFECTS ON THE TOTAL WEIGHTS OF THE VARIOUS ANALYTIC PORTIONS OF THE TEETH, FOR EACH SUB-GROUP OF RATS. (*See Table 3.*)

Experiment No.	Sex of rats.	Glandular material ingested.[1]	Rat sub-group.[2]	Total weights of tooth portions.			Balances: C > E is signified by +; E > C is signified by −		
				Dry. (Total solids.)	Ash.	Organic matter.	Dry. (Total solids.)	Ash.	Organic matter.
				mg.	mg.	mg.			
1	♀	Lymphatic	C	337.2	245.4	91.8			
			E	297.1	214.9	82.2			
			diff.	40.1	30.5	9.6	+	+	+
2	♂♀	Lymphatic	C	409.6	290.9	118.7			
			E	436.4	313.0	123.4			
			diff.	−26.8	−22.1	−4.7	−	−	−
11	♂♀	Pineal	C	412.6	302.0	110.6			
			E	418.5	312.3	106.2			
			diff.	−5.9	−10.3	4.4	−	−	+
12	♂♀	Pineal	C	328.4	250.3	78.1			
			E	309.9	228.5	81.4			
			diff.	18.5	21.8	−3.3	+	+	−
5	♀	Salivary	C	325.2	243.9	81.3			
			E	317.6	234.9	82.7			
			diff.	7.6	9.0	−1.4	+	+	−
6	♀♂	Salivary	C	315.8	231.6	84.2			
			E	386.8	290.5	96.3			
			diff.	−71.0	−58.9	−12.1	−	−	−
13	♂	Salivary	C	415.2	314.5	100.7			
			E	433.4	324.2	109.2			
			diff.	−18.2	−9.7	−8.5	−	−	−
15	♂	Salivary	C	212.3	163.4	48.9			
			E	214.0	164.8	49.2			
			diff.	−1.7	−1.4	−0.3	−	−	−
3	♀♂	Spleen	C	317.3	228.1	89.2			
			E	286.1	201.7	84.4			
			diff.	31.2	26.4	4.8	+	+	+

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4	♀♂	Spleen	C	408.3	296.3	112.0			
			E	402.6	289.5	113.1			
			diff.	5.7	6.8	—1.1	+	+	—
7	♂	Testicle	C	348.4	254.2	94.2			
			E	294.0	216.9	77.1			
			diff.	54.4	37.3	17.1	+	+	+
8	♂	Testicle	C	507.4	373.4	134.0			
			E	429.8	307.2	122.6			
			diff.	77.6	66.2	11.4	+	+	+
14	♂	Testicle	C	248.6	191.4	57.2			
			E	180.8	133.1	47.7			
			diff.	67.8	58.3	9.5	+	+	+
16	♂	Testicle	C	125.0	90.8	34.2			
			E	167.5	122.4	45.1			
			diff.	—42.5	—31.6	—10.9	—	—	—
9	♀	Thyroid	C	289.6	215.6	74.0			
			E	250.3	184.5	65.8			
			diff.	39.3	31.1	8.2	+	+	+
10	♂	Thyroid	C	282.4	209.4	73.0			
			E	268.9	199.2	69.7			
			diff.	13.5	10.2	3.3	+	+	+

[1] See summary of details regarding glandular materials used, page 113.
[2] C rats are "control" ones; E rats are "experimental," i.e. *treated*, animals.

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TABLE 5.—DATA PERTAINING TO COMPARATIVE EFFECTS ON "CALCIUM BALANCES" IN THE COMPOSITION OF THE TEETH FOR EACH SUB-GROUP OF RATS. (*See Table 3.*)

Exp. No.	Sex in each sub-group.	Number of rats in each sub-group.		Percentage of calcium in the teeth.							
				Dry teeth.				Ash.			
						Difference.				Differences.	
		C^1	E^1	C^1	E^1	C > E	E > C	C^1	E^1	C > E	E > C
				Lymphatic gland.							
1	♂♀	2	2	25.47	24.82	0.65	. .	34.99	34.35	0.64	. .
2	♂♀	3	3	25.71	25.47	0.24	. .	36.20	35.50	0.70	. .
				Pineal gland.							
11	♂♀	3	3	26.87	26.93	. .	0.06	36.70	36.09	0.61	. .
12	♂♀	2	2	28.35	28.79	. .	0.44	37.19	39.04	. .	1.85
				Salivary gland.							
5	♀	2	2	25.87	24.74	1.13	. .	34.50	33.44	1.06	. .
6	♀♂	2	2	24.76	24.76	. .	. .	33.77	32.97	0.80	. .
13	♂♂	2	2	27.53	26.49	1.04	. .	36.34	35.41	0.93	. .
15	♂	1	1	28.66	26.78	1.88	. .	37.24	34.77	2.47	. .
				Spleen.							
3	♀♂	2	2	25.24	25.43	. .	0.19	35.10	36.06	.	0.96
4	♀♂	3	3	25.40	28.89	1.51	. .	35.00	33.23	1.77	. .

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Testicle.

7	♂	2	2	24.60	25.92	. .	—	1.32	33.72	35.13	. .	1.41
8	♂	3	3	25.57	26.87	. .	—	1.30	34.75	37.59	. .	2.84
14	♂	1	1	28.74	28.69	0.05	—	. .	37.31	38.97	. .	1.66
16	♂	1	1	27.10	28.31	. .	—	1.21	37.29	38.73	. .	1.44

Thyroid.

9	♀	2	2	29.73	29.03	0.70	—	. .	39.93	39.38	0.55	. .
10	♂	2	2	28.56	28.19	0.37	—	. .	38.52	38.06	0.46	. .

(C rats are "control" ones; E rats are "experimental," i.e. *treated*, animals.

nature, weight, and treatment of the sub-groups of animals in, and the duration of, each experiment and part thereof—all arranged in the sequence of the experiments as inaugurated by us. In Table 2 are summarized the total weights of each sub-group of rats at the end of each corresponding experiment, and their differences; also the total gains in weight for the C and E rats of each experiment, and their differences—all arranged in sections according to the treatment. In Table 3 are given, in extension of the data in Table 1, the collective weight of the four incisor teeth of each rat in terms of dry weight (total solids), the yield of ash, the content of organic matter, and the corresponding percentages in the dry weight; also the percentages of calcium in both the dry teeth (total solids) and their mineral portion (ash), for each sub-group of rats. Table 4 summarizes the weights of the gross analytic portions of the teeth for each sub-group, from the individual data in Table 3 and indicates sub-group differences in mathematical terms, and by plus and minus signs. Table 5 shows the differences between the C and E percentages of calcium in the teeth for each experiment, expressed for the dry teeth (total solids) and their mineral portion (ash).

III. Discussion of the Experimental Results.

A general examination of Table 5 reveals the fact that of the 15 "calcium balances" shown under the head of "dry teeth," 9 are on the side of the "control" teeth (C) and 6 on the side of the "experimental" teeth (E); in other words, the dry teeth of 9 of the 16 *treated* groups contained *less* calcium than the dry teeth of the corresponding control animals, and the dry teeth of 6 *treated*

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groups contained *more* calcium. (In Exp. 6 the values for C and E are equal.)

On the other side of Table 5, under the head of "ash," a similar situation may be noted. Of the 16 "calcium balances," 10 are on the side of the "control" teeth (C) and 6 on the side of the "experimental" teeth (E); that is to say, the mineral portion of the teeth of 10 of the 16 *treated* groups (E) contained *less* calcium than the proportions in the teeth of the corresponding "control" animals, and the mineral portion of the teeth of 6 *treated* groups contained *more* calcium. Briefly, then, the gross differences in Table 5 suggest, superficially at least, that, in general, the dosage caused, or was followed by, impaired or subnormal calcification of the teeth in the anabolic sense, or decalcification in the actively abnormal catabolic sense, or both.

If, however, we estimate gross effects in terms of general averages, we find that the average surplus of calcium (Table 5) for the 9 cases in which the control *dry* teeth (C) contained more calcium than that in the dry teeth of the corresponding treated rats (E), is 0.84 per cent.; for the *dry* teeth of the 6 treated groups (E), with plus calcium differences, the average is 0.75 per cent. For the 16 groups there is an average gross surplus of calcium for C teeth over E teeth amounting to 0.19 per cent., or an average *deficiency* of this slight proportion of calcium in the *dry* teeth of the treated rats—a general mathematical result in harmony with the foregoing deduction in this connection.

The average surplus of calcium, for the 10 cases in which the mineral portion (ash) for the control teeth (C) contained more calcium than that in the ash from the teeth of the corresponding treated rats (E), is 1.00 per cent.; for the ash from the teeth of the 6 treated groups (E), with plus calcium differences, it is 1.69 per cent. For the 16 groups, there is an average gross surplus of calcium for E teeth over C teeth amounting to 0.11 per cent., or an average *surplus* of calcium to this extent in the mineral portion of the teeth of the treated rats. These mathematical facts fail to support the general inference stated above.

If, instead of relying upon "majority vote" or "general average," we study individual peculiarities, we note the agreements and disagreements among the "calcium balances" (sub-groups) for dry teeth (total solids), and their mineral portions (ash), that are shown in the appended summary of direct comparisons (Table 5):

C > E. Dry: Lymphatic, salivary (3:0),[8] thyroid.
Ash: Lymphatic, salivary (4:0), thyroid.
E > C. Dry: Pineal, testicle (3:1).
Ash: —o—, testicle (4:0).
C = E. Dry: —o—, spleen.
Ash: Pineal, spleen.

We see, from the facts in this summary, that, of the six sets of experiments, three (with lymphatic, salivary, and thyroid glands) agree in the indication that degree of calcification was *reduced* by, or in association with, the treatment, in both the dry (total solids)

[8] In one of the four salivary experiments (6) the C and E values for *dry* teeth were equal.

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and mineral portions (ash) of the incisor teeth in every experiment except one of the eight with these glandular materials. In only one case was there similar agreement in favor of the inference that degree of calcification was *increased* by, or in association with, the treatment, in both the dry (total solid) and mineral (ash) portions of the teeth, *i.e.* in the case of the experiments with testicle.

The disparities in this connection, among the other two groups of "calcium balances" (C ± E), nullify any significance their single balances might have, where the balances are not intrinsically too small to signify anything in particular in the first place. It is impossible to believe, from the results for proportion of calcium in the dry teeth (total solids), and from the results for proportion of calcium in the mineral portion (ash) of the teeth, that pineal gland and spleen had any effect on calcification—the lack of concordance among the balances makes such an inference untenable.

At most, then, we conclude, in this connection, from the results of these particular experiments, that the treatment with glandular materials was directly or indirectly responsible for effects on degree of calcification in the teeth in some of the experiments—*decrease* induced by the lymphatic, salivary, and thyroid glands; *increase* caused by testicle.[9]

This general deduction strikingly confirms, in the main, the conclusion from our first series of experiments, which was stated by Miller and Gies as follows (*loc. cit.*, p. 184):

> At most, then, we conclude, in this connection, that possibly the treatment with glandular materials was directly or indirectly responsible for effects on [degree of] calcification in the teeth in some of the experiments —*decrease* induced by the pineal, salivary, and thyroid glands; *increase* caused by testicle.

In Table 6 we present a recapitulation of the most significant data from the paper by Miller and Gies (*loc. cit.*) and from the present one, where the general agreement between the results obtained in this connection, by Miller and Gies and by us, may be seen at a glance.

That the dosage did not impair the general nutrition of the rats, except in the case of treatment with thyroid, is clearly indicated by the figures in Table 2, where the data for "weight balances" show that, in 16 experiments, the E rats were *heavier* than the C rats at the ends of 10 tests, and that the E rats *gained* more than the C rats in 11 of the 16 experiments. The data in Table 2 show, with equal definiteness, that the effects on dental calcification were induced independently of influences on the body-weights of the rats.[10]

That there were no material effects of the treatment on the dimensions and the curvature of the teeth was stated in the description of methods (page 114).

The data in Table 4 show that, in 10 cases of the 16, the weights of the *dry* control teeth (C) were greater than the corresponding weights for the treated animals (E); that in 8 cases of the 16, the weights of the *organic* portion in the control teeth (C) were greater than the

[9] Miller and Gies found, as we did, that there was marked decrease in degree of calcification after treatment with *lymphatic* gland; but, as they had only one experiment with this material, they could not attach the special importance to this result that it now appears to possess. Our results with *pineal* gland nullify the significance originally given tentatively by Miller and Gies to their findings with this material.

[10] The results obtained by Miller and Gies, in this connection, were not so clearly independent of effects on body-weight. See their paper (*loc. cit.*) at page 185.

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TABLE 6.—DATA PERTAINING TO COMPARATIVE EFFECTS ON "CALCIUM BALANCES" IN THE COMPOSITION OF THE INCISOR TEETH OF RATS, COMPILED FROM TABLE 6 IN THE PAPER BY MILLER AND GIES (*loc. cit.*) AND FROM TABLE 5 OF THIS PAPER.

Experiment No.		Sex.	Differences in the percentages of calcium in the teeth.[1]			
			Dry teeth.		Ash.	
Miller and Gies.	Heft and Gies.		C > E	E > C	C > E	E > C
Lymphatic gland.						
13	. .	♂♀	3.94	. .	5.48	. .
. .	1	♀♀	0.65	. .	0.64	. .
. .	2	♂♀	0.24	. .	0.70	. .
Pineal gland.						
7	. .	♂♀	0.71	. .	0.90	. .
17	. .	♂♂♀	2.16		3.10	. .
. .	11	♂♂♀♀	. .	0.06	0.61	. .
. .	12	♂♂	. .	0.44	. .	1.85
Salivary gland.						
14	. .	♀♀♀	1.81	. .	2.00	. .
23	. .	♀♀♀	2.01	. .	3.02	. .
. .	5	♀♀♀	1.13	. .	1.06	. .
. .	6	♂♀	. . [2]	. . [2]	0.80	. .
. .	13	♂♂♂	1.04	. .	0.93	. .
. .	15	♂♂♂	1.88	. .	2.47	. .
Spleen.						
2	. .	♂♀♀	0.66	. .	0.38	. .
. .	3	♂♂♀	. .	0.19	. .	0.96
. .	4	♂♂♀	1.51	. .	1.77	. .
Testicle.						
1	. .	♂♂	. .	0.02	. .	1.05
24	. .	♂♂	. .	1.47	. .	2.90
. .	7	♂♂♂	. .	1.32	. .	1.41
. .	8	♂♂♂	. .	1.30	. .	2.84
. .	14	♂♂♂♂	0.05	. .	. .	1.66
. .	16	♂♂♂♂	. .	1.21	. .	1.44
Thyroid.						
4	. .	♂♂	2.62	. .	1.87	. .
5	. .	♂♀♀	3.04	. .	4.06	. .
11	.	♂♂♀	1.79	. .	4.23	. .
15	. .	♂♀	0.19	. .	.	1.04
. .	9	♀♀	0.70	. .	0.55	.
. .	10	♀♂	0.37	. .	0.46	. .

[1] C rats are "control" ones; E rats are "experimental," i.e. *treated*, animals.
[2] The values for dry teeth in Exp. were exactly equal.

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corresponding weights for the treated rats (E); and that in 10 cases of the 16, the weights of the *ash* from the control teeth (C) were greater than the corresponding weights for the "experimental" rats (E). In 7 of the 16 cases, the weights of these three portions of the control teeth were greater, respectively, for the thyroid treatment. This result agrees with the previous indication for effects of treatment with thyroid gland. There was practical unanimity among the "balance signs" for effects of the treatments with spleen—all plus signs except one. There was also practical unanimity among the "balance signs" for

TABLE 7.—DATA PERTAINING TO "WEIGHT BALANCES" FOR THE VARIOUS ANALYTIC PORTIONS OF THE TEETH FOR SUB-GROUPS OF RATS, COMPILED FROM TABLE 5 IN THE PAPER BY MILLER AND GIES (*loc. cit.*) AND FROM TABLE 4 OF THIS PAPER.

Experiment No.		Sex.	Weight balances: [1] C > E is signified by +, E > C is signified by −		
Miller and Gies.	Heft and Gies.		Dry. (Total solids)	Ash.	Organic Matter.
Salivary gland.					
14	. . .	♀	+	+	−
23	. . .	♀	+	+	+
. . .	5	♀	+	+	−
. . .	6	♂	−	−	−
. . .	13	♂	−	−	−
. . .	15	♂	−	−	−
Testicle.					
1	. . .	♂	+	+	+
24	. . .	♂	+	+	−
. . .	7	♂	+	+	+
. . .	8	♂	+	+	+
. . .	14	♂	+	+	+
. . .	16	♂	−	−	−

[1] C rats are "control" ones; E rats are "experimental," i.e. *treated*, animals.

than the corresponding weights for the treated rats. In 5 cases of the 16 these three weights were greater for the teeth of the treated rats than for the teeth of the control ones. In the case of only one kind of treatment—with thyroid gland—was there unanimous agreement among all the signs for the differences on these three items, for the teeth of the control and treated rats in the experimental group; *i.e.* there were only plus balances effects of the treatment with salivary gland and testicle: 10 − and 2 + for salivary, 9 + and 3 − for testicle. On the basis of our previous standards for comparison, the latter two treatments appeared to have been influential. The teeth of the rats treated with salivary glands weighed more than those of the corresponding controls, but contained smaller proportions of calcium, whereas the teeth of the rats treated with testicle

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weighed less than those of the corresponding controls, but contained larger proportions of calcium.

It is impossible to attach to the results for salivary treatment the importance they appear to merit, because they are contrary to those obtained by Miller and Gies, although the *difference in the sex of the animals,* in their experiments and ours, may account for the disagreement. Table 7 presents a summary of the balance signs, in these connections, from Table 5 in the paper by Miller and Gies (*loc. cit.*) and from Table 4 in the present paper, where the justification for these views will be seen at a glance. It is evident that additional experiments should be performed along the lines of these suggestive results with salivary gland and testicle. We propose to conduct them.

In accord with the attitude of Miller and Gies, in the interpretation of their results, we have refrained, throughout the discussion of our data, from attaching undue significance to the *concordance* among our findings, for, although every instance of such agreement supports the belief on which these studies are proceeding, we prefer to underrate the *apparent* value of our results rather than ascribe to them an import or an importance that additional repetitions would deny them.

Many additional experimental details might be brought forward for special consideration, such as the relation of the age of the animals to the results, but we feel that their discussion would not be profitable at this stage of our progress in these studies.

IV. Summary of General Conclusions.

Feeding experiments (16) of extended duration (28–122 days), with glandular tissues and preparations (6 kinds), on white rats (66), yielded results which suggest that the proportions of calcium in both the dry (total solid) and mineral (ash) portions of the incisor teeth were *decreased* by treatment with lymphatic gland, salivary gland, and thyroid gland, and *increased* by treatment with testicle. These results confirm the findings with these glands reported by Miller and Gies (*loc. cit.,* p. 188).

Similar tests with pineal gland and spleen, in repetition of the experiments with these materials by Miller and Gies, yielded data that agreed in part with the findings of Miller and Gies, but the results were indecisive.

There were no discernible effects on the dimensions or curvature of the incisor teeth in any of the experiments.

The organic and mineral portions of the teeth of the rats treated with salivary glands weighed *more* than those of the corresponding controls, but these teeth contained *smaller* proportions of calcium.

The organic and mineral portions of the teeth of the rats treated with testicle weighed *less* than those of the corresponding controls, but these teeth contained *larger* proportions of calcium.

The organic and mineral portions of the teeth of the rats treated with thyroid weighed *less* than those of the corresponding controls and the teeth contained *smaller* proportions of calcium. The rats treated with thyroid were the only ones whose nutrition appeared to be impaired by the dosage.

The main results are regarded as suggestive only, not as conclusive, despite their strong corroboration of the findings of Miller and Gies. The experiments should, and will, be repeated and extended.

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[*See* NOTE, *page 111.*]

Studies of Internal Secretions in Their Relation to the Development and Condition of the Teeth.

By WILLIAM J. GIES and COLLABORATORS.

(*From the Biochemical Laboratory of Columbia University, at the College of Physicians and Surgeons, New York.*)

4. Effects of Castration.[1]

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BEING the second section[2] of the *sixth* annual report, for 1915–16, by William J. Gies and collaborators, on investigations under the auspices of the Research Committee of the Dental Society of the State of New York, Dr. Wm. B. Dunning, chairman; and the second section of the *second* annual report on investigations under the auspices of the Scientific Foundation and Research Commission of the National Dental Association, Dr. Weston A. Price, chairman.

I. Introduction.

The preceding papers in this particular series described studies of effects, on dentition in albino rats, of thyro-parathyroidectomy and thymectomy,[3] and of feeding interno-secretory glandular tissues, preparations, and extracts.[4 5] This paper presents the results of experiments on the dental effects of bilateral castration in male albino rats.[6]

II. Experimental.

ANTE-MORTEM PROCEDURE. The animals were kept and fed under the con-

[1] The three preceding papers in this series were published by (1) Morgulis, Perlzweig, and Gies, in the *Dental Cosmos*, 1915, lvii, p. 276, and reprinted in the *Transactions of the Dental Society of the State of New York*, 1914, p. 105; by (2) Miller and Gies, in the *Transactions of the Dental Society of the State of New York*, 1915, p. 161, and abstracted in the *Journal of the Allied Dental Societies*, 1916, xi, p. 47; by (3) Heft and Gies—see p. 112 (with Note on p. 111).

[2] The first section of this report precedes this paper. See Heft and Gies, p. 112.

[3] Morgulis, Perlzweig and Gies: *Transactions of the Dental Society of the State of New York*, 1914, p. 105 (also *Dental Cosmos*, 1915, lvii, p. 276).

[4] Miller and Gies: *Ibid.*, 1915, p. 161 (also abstracted in the *Journal of the Allied Dental Societies*, 1916, xi, p. 47).

[5] Heft and Gies, p. 112.

[6] For convenience of comparison by the reader, this paper follows the general style and arrangement of the papers by Miller and Gies, and Heft and Gies (footnote 1, above).

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ditions that prevailed in the experiments described by Miller and Gies (*loc. cit.*, p. 162).

Surgical operations. The "experimental" (E) rats were rapidly emasculated under general ether anesthesia, with ordinary aseptic precautions. The testes were pushed, by gentle pressure, through a small median incision in the scrotum, the connecting vessels and tissue ligated with silk thread, the testes cut off, the connecting tissue returned through the wound, and the lips of the latter stitched.

The operations were usually conducted during the third week of the suckling period—often before the testes had descended. In the latter cases it was usually possible, with very little effort and without harm to the animals, to push down the testes from the abdomen through the surgical opening in the scrotum. The operations were conducted without hemorrhage. The animals recovered promptly from the effects of the anesthetic. The wounds healed without suppuration in every instance, usually by first intention. The "control" (C) animals were subjected to anesthesia for periods of similar length.

Quotations from the protocols of the experiments. Data bearing significantly on the condition of the rats in each experiment, as the tests proceeded, are summarized below from our records. *Unless otherwise indicated below,* in the quotations from the protocols, the following statement of *general* facts applies to *all* rats in each experiment.

A. The rats for each experiment were selected from a litter born in this laboratory—in each case of a mother in our own "breeding colony."

B. Dietary schedule:

Sunday. Cabbage, cheese.
Monday. Corn, meat.
Tuesday. Barley, bread.
Wednesday. Oats, meat.
Thursday. Corn, bread.
Friday. Rye, cheese.
Saturday. Oats, meat.

C. Nutritive condition was good; the animals were hale and hearty.

D. Each group of rats was kept in a suitable cage, where all the living conditions were the same in general for each rat in the group.

E. The teeth were normal in general appearance; length, width, thickness, and curvature, were not materially affected by the treatment.

F. At the beginning of each experiment the individual rats of a group were weighed and paired on the basis of approximate equality in weight, one of each pair serving as a "control" rat (C), the other as an "experimental" rat (E). The animals were weighed weekly.

G. The rats were suitably marked with picric acid, excess of which was carefully washed off immediately with water. "Control" rats in a group are designated CA and CB in the tables; "experimental" rats, EC, ED. In this notation the second letter indicates the individual in its group and sub-group sequences.

H. On November 18, 1915, and again on January 31, 1916, normal healthy females were added to each group, in order to stimulate, if possible, the production of differences, between the C and E rats, that might arise from sexual activity. None of the females became pregnant, however. (See page 140.)

I. Immediately after the death of an animal in a group was discovered an associated C or E rat was chloroformed, so that the "time element" was uniformly the same for all the corresponding C and E rats in a group.

J. At autopsy nothing abnormal was observed.

For the reader's convenience, the *special* data of the experiments are summarized below, from the protocols, the numerals at the heads of the sub-sections indicating the experiments in the order of their inauguration and in their sequence in the arrangement of analytic

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and other data in the accompanying tables.

1. Two rats were used; one was castrated. The body-weights increased fairly steadily to December 3d, and then became approximately constant to about April 7th, when the E rat began to lose weight; it died on April 24th. On March 4th and on March 28th additional healthy females were placed with the group.

2. Three rats were used, two of which were castrated. There was a swelling in rat EC, at the site of the operation, on and after October 22d. The rats gained steadily in weight to January 7th, after which their weights remained practically constant.

3. Four rats were used. Rats CA, EC, and ED were from one litter, but CB was from another, one day older. The rats of the younger litter were rather thin, but otherwise normal. Rat ED died on October 13th, not having shown any symptoms; CA was then chloroformed. On January 7th "infection" was noted on the edges of the ears of the surviving rats.[7] This infection did not become severe. The weights steadily increased until December 3d, after which they remained fairly constant, with occasional gains.

4. Three rats were taken, two of which were castrated. The mother of this litter showed marked "discoordination" after nursing the litter a week or ten days. The rats were not so well nourished as those of the previous litters, but seemed normal. On October 9th the penis of the control rat protruded, and failed thereafter to retract. "Ear infection" appeared in the group about January 28th. The gain in weight was steady throughout, until November 12th, after which the weights were practically stationary. The weights of the C and E rats ran parallel.

5. Two rats were taken, one of which was castrated. The testicles were late in descending. "Ear infection" began to appear in this group about January 15th. Gain in weight was steady to October 29th, after which it was slower, but continued until December 17th, after which all gains were very slight. When the animals were chloroformed, rat CA was in better condition, in general, than rat EC.

6. Four rats were taken from a litter of eleven (which included six females). The mother, fairly old, had previously given birth to several litters. These rats grew slowly, but were apparently normal except that they were smaller than usual for their age. The testicles were late in descending. At operation the testicles were not much larger than a fat grain of wheat, the smallest obtained so far. Rat ED died on September 21st, no symptoms having been noted. Rat CA was then killed. The second control rat died on October 11th. The weights steadily though slowly increased until September 18th, after which the weights of the C rats declined. The weights of the E rats also fell after September 25th. These rats were put through the usual routine in spite of their emaciation, etc., in the belief that the dental data might bear on malnutrition if not on castration. (See page 139.) The death of rat ED appeared to be due to causes independent of the operation. One of the sisters of these males died in general debility on September 29th.

7. Four rats were taken from a litter of ten, six of which were females. This was the first litter from a particularly young mother. The rats were healthy. At operation, one testicle in rat EC was removed, but the other had not descended, and could not be pushed into the scrotum. The testicles were wholly removed from rat ED. Two days later (August 30) the remaining testicle was removed from rat EC. On October 29th, a swelling appeared in rat EC at the site of operation. Diarrhea affected the group on November 5th, and persisted for over a week. Rat CB died on November 18th; its testicles were small and poorly developed, and one upper incisor tooth was broken, the other being somewhat longer than usual. Rat CA died on November 19th. Its testicles were small and internal; the lower incisors were short, the upper ones rather long. The weights increased fairly consistently, though slowly, but the C rats lost weight after October 29th.

8. Two rats were taken from a litter of seven, one of which was castrated. Diarrhea appeared in the group on October 2d, persisting for about a week. On November 5th the penis of the C rat protruded and remained in that condition. Diarrhea again appeared, lasting only a short time. The E rat had diarrhea on November 26th, when a tumor-

[7] For facts regarding such "infections," see page 115.

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like mass appeared at the site of the operation. "Ear infection" appeared on January 7th, growing more severe until, by January 21st, the general health of the rats was poor. The weights steadily though slowly increased until December 17th, after which they remained approximately constant. By March 1st the condition of the rats had become very poor. The "infection" that started in the ears had spread over the tail, nose, back, and belly. The hair on these parts had disappeared and the skin was scaly. On March 18th, the E rat died. The testicles were somewhat undersized in the C rat.

9. Two rats were taken from a litter of seven, one of which was castrated. The C rat was poorly nourished, though well formed and lively. Its teeth were normal, but very small. On November 12th the rats had diarrhea, which persisted for a week. "Infection" appeared on the noses of this group on January 21st. Carbolated vaseline was carefully applied, and the condition of the noses was improved, but the "infection" reappeared on the back of rat E. The weights increased steadily, remaining about stationary after February 11th.

10. Four rats were taken, from a litter of eleven, two of which were castrated. The teeth were normal, but very small. Undescended testes were obtained at operation with difficulty. On October 2d an abscess appeared on the abdomen of rat CA, though otherwise it seemed to be in good health. (See below.) On October 9th a tumor-like mass developed at the site of the operation in rat EC, which died October 14th; CA was then chloroformed. Autopsy showed an abscess, with pus and bloody edematous fluid in the scrotum of rat EC. The "abdominal abscess" in rat CA proved to be subcutaneous and filled with edematous fluid; there was also a pus-sac in the region of the testes in CA and its testes were small. On November 2d rat CB died, having been feeble for some time; its testicles were small, and internal. The body-weights increased slowly but fairly steadily throughout.

11. Two rats were taken from a litter of eight (five were females), born of a mother that had been injected with trypan-blue in another series of experiments. One was castrated. The testes of the castrated rat were small and had to be pushed down hard for removal. On October 9th the E rat presented a swelling at the site of the operation, which persisted for some time. The body-weights increased fairly regularly, with occasional losses. On March 3d the E rat died. Nutritive condition was poor, especially of the E rat.

GENERAL POST-MORTEM PROCEDURE RELATING TO THE INCISOR TEETH. The incisor teeth were obtained and prepared for analysis by the procedure described by Miller and Gies (*loc. cit.*, p. 169).

ANALYTIC METHODS APPLIED TO THE INCISOR TEETH. The teeth were analyzed by the method described by Miller and Gies (*loc. cit.*, p. 169).

ANALYTIC RESULTS AND OTHER DATA. In the accompanying table (Table 1) we present our data pertaining to the age, weight, and number of the rats; the weight and treatment of the sub-groups of animals in, and the duration of, each experiment and part thereof—all arranged in the sequence of the experiments as inaugurated by us. In Table 2 are summarized the average weights of each sub-group of rats at the end of each corresponding experiment, and their differences; also the average gains in weight for the C and E rats of each experiment, and their differences. In Table 3 are given, in extension of the data in Table 1, the collective weight of the four incisor teeth of each rat, in terms of dry weight (total solids), yield of ash, content of organic matter, and the corresponding percentages in the dry weight; also the percentages of calcium in both the dry teeth (total solids) and their mineral portion (ash) for each sub-group of rats. Table 4 summarizes the weights of the gross analytic portions of the teeth for each sub-group, from the individual data in Table 3, and indicates sub-group differences in mathematical terms and by plus and minus signs. Table 5 shows

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TABLE 1.—DATA PERTAINING TO EFFECTS ON THE BODY-WEIGHTS OF THE RATS. (*See Table 2.*)

Exp. No.	Rat Sub-group.	Date of birth of rat.	Date of beginning of experiment.	Date of ending of experiment.	Age of rat at death.	Duration of exp.	Weight of rat.		
							Beginning of experiment.	End of experiment.	Gain.
		1915.	1915.	1915–16.	days.	days.	grams.	grams.	grams.
1	CB[1]	July 4	Aug. 6	Apr. 24	295	262	33.5	149.0	115.5
	EE[1]	" 4	" 6	" 24	295	262	37.0	100.5	63.5
2	CA	July 16	Aug. 7	Mar. 21	249	227	29.5	157.0	127.5
	EC	" 16	" 7	" 21	249	227	29.0	155.0	126.0
	ED	" 16	" 7	" 21	249	227	27.5	121.0	93.5
3	CA	July 20	Aug. 9	Mar. 14	238	218	31.5	132.0	100.5
	CC	" 21	" 9	Oct. 13	84	65	22.5	67.0	44.5
	ED	" 21	" 9	Mar. 14	237	218	24.5	152.0	127.5
	EE	" 21	" 9	Oct. 13	84	65	28.5	65.0	36.5
4	CA	July 19	Aug. 13	Mar. 23	248	223	24.5	145.0	120.5
	EB	" 19	" 13	" 23	248	223	27.5	165.0	137.5
	EC	" 19	" 13	" 23	248	223	24.5	127.5	103.0
5	CA	July 31	Aug. 24	Apr. 22	266	242	30.0	105.5	75.5
	EC	" 31	" 24	" 22	266	242	30.5	97.0	66.5
6	CA	Aug. 1	Aug. 25	Sept. 21	51	27	21.0	38.0	17.0
	CB	" 1	" 25	Oct. 11	71	47	17.0	26.0	9.0
	EC	" 1	" 25	" 11	71	47	17.5	62.5	45.0
	ED	" 1	" 25	Sept. 21	51	27	20.5	28.0	7.5
7	CA	Aug. 10	Aug. 28	Nov. 19	101	83	17.0	64.0	47.0
	CB	" 10	" 28	" 18	100	82	17.0	47.0	30.0
	EC	" 10	" 28	" 19	101	83	19.5	79.0	59.5
	ED	" 10	" 28	" 19	101	83	17.5	90.5	73.0
8	CB	Aug. 13	Sept. 1	Mar. 18	218	199	21.0	88.0	67.0
	ED	" 13	" 1	" 18	218	199	21.5	. . .[2]	. . .
9	CB	Aug. 14	Sept. 1	Apr. 24	254	236	16.5	121.5	105.0
	ED	" 14	" 1	" 24	254	236	22.5	147.5	125.0
10	CA	Aug. 16	Sept. 2	Oct. 14	59	42	18.5	56.0	37.5
	CB	" 16	" 2	Nov. 2	78	61	15.5	40.0	24.5
	EC	" 16	" 2	" 2	78	61	16.5	90.0	73.5
	ED	" 16	" 2	Oct. 14	59	42	16.5	38.0	21.5
11	CA	Aug. 19	Sept. 4	Mar. 3	197	181	17.0	100.0	83.0
	EB	" 19	" 4	" 3	197	181	17.0	. . .[2]	. . .

[1] C rats are "control" ones- A (1) and B (2); E rats are "experimental," i.e. *castrated,* animals—C (3), D (4), E (5).

[2] The weights could not be determined, the animal having been partly eaten by its associates. At the last preceding weekly weighing the weights of the C and E rats were practically identical.

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the differences between the C and E percentages of calcium in the teeth for each experiment, expressed for the dry teeth (total solids) and their mineral portion (ash).

(C) and 7 on the side of the "experimental" teeth (E); that is to say, the mineral portion of the teeth of 4 of the 11 *castrated* groups (E) contained less calcium than the proportions in the teeth

TABLE 2.—DATA PERTAINING TO BODY-WEIGHT BALANCES. (*See Table 1.*)

(The values recorded in this table represent the *average* weight of the rats in each sub-group.)

Exp. No.	Gross weights of rats at the ends of the experiments.				Gain in weight during the experiments.			
	C[1]	E[1]	Balance. C > E	Balance. E > C	C[1]	E[1]	Balance. C > E	Balance. E > C
	grams.	grams.	grams.	grams.	grams.	grams.	grams.	grams.
1	149.0	100.5	48.5	. .	155.5	68.5	52.0	. .
2	157.0	138.0	19.0	. .	127.5	110.0	17.5	. .
3	99.5	108.5	. .	9.0	72.5	82.0	. .	9.5
4	145.0	146.5	. .	1.5	120.5	120.5	. .	. .
5	105.5	97.0	8.5	. .	75.5	66.5	9.0	. .
6	32.0	45.5	. .	13.5	13.0	26.5	. .	13.5
7	55.5	85.0	. .	29.5	38.5	67.0	. .	28.5
8	88.0	?[2]	?	?	67.0	?	?	?
9	121.5	147.5	. .	26.0	105.0	125.0	. .	20.0
10	48.0	64.0	. .	16.0	31.0	47.5	. .	6.5
11	100.0	?[2]	?	?	83.0	?	?	?

[1] C rats are control rats; E rats are "experimental," i.e. *castrated*, animals. (See Table 1.)

[2] The weights indicated by (?) are unknown. In these cases the animals died and the bodies were partly eaten by others of the group. At the last preceding weekly weighing the weights of the C and E rats were practically identical.

III. Discussion of the Experimental Results.

A general examination of Table 5 reveals the fact that of the 11 "calcium balances" shown under the head of "dry teeth," 5 are on the side of the "control" teeth (C) and 6 on the side of the "experimental" teeth (E); in other words, the dry teeth of 5 groups of the 11 *castrated* groups contained less calcium than the dry teeth of the corresponding control animals, and the dry teeth of 6 *castrated* groups contained more calcium.

On the other side of Table 5, under the head of "ash," a similar situation may be noted. Of the 11 "calcium balances," 4 are on the side of the "control" teeth

of the corresponding "control" animals, and the mineral portion of the teeth of 7 *castrated* groups contained more calcium.

If, however, we estimate gross effects in terms of general averages, we find that the average surplus of calcium (Table 5), for the 5 cases in which the "control" *dry* teeth (C) contained more calcium than that in the dry teeth of the corresponding *castrated* rats (E), is 1.16 per cent.; for the *dry* teeth of the 6 experimental groups (E), with plus calcium differences, it is 1.22 per cent. For the 11 groups there is an average gross excess of calcium for E teeth over C teeth amounting to 0.14 per cent., or an average *surplus* of this slight proportion

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of calcium in the *dry* teeth of the *castrated* rats.

portion (*ash*) for the "control" teeth (C) contained more calcium than the

TABLE 3.—DATA PERTAINING TO EFFECTS ON THE WEIGHTS AND GENERAL COMPOSITION OF THE INCISOR TEETH OF THE RATS. (*See Tables 1, 4 and 5.*)

Exp. No.	Rat sub-groups.	Teeth.						
		Weight.			Per cent. of dry weight.		Calcium.	
		Dry.	Ash.	Organic.	Ash.	Organic.	Per cent. of dry weight.	Per cent. of ash.
		mg.	mg.	mg.	%	%	%	%
1	CB[1]	242.6	182.1	40.5	75.06	24.94	24.55	32.70
	EE[1]	199.0	144.7	54.3	72.71	27.29	24.67	33.24
2	CA	168.7	119.1	49.6	70.59	29.41	23.92	33.88
	EC	109.3	77.9	31.4	71.27	28.73	23.84	34.18
	ED	160.8	110.5	50.3	68.72	31.28		
3	CA	140.9	99.3	41.6	70.48	29.52	25.04	36.47
	CC	86.9	57.1	29.8	65.71	34.29		
	ED	168.6	121.4	47.2	72.00	28.00	23.92	33.80
	EE	110.5	76.1	34.4	68.87	31.13		
4	CA	171.9	122.8	49.1	71.44	28.56	22.94	32.11
	EB	172.8	123.3	49.5	71.35	28.65	24.08	33.47
	EC	176.6	128.0	48.6	72.42	27.58		
5	CA	201.1	149.4	51.7	74.29	25.71	23.79	32.02
	EC	208.1	156.0	52.1	74.96	25.04	24.56	32.77
6	CA	76.2	53.2	23.0	69.81	30.19	22.11	31.16
	CB	90.8	64.3	26.5	70.70	29.30		
	EC	95.0	67.1	27.9	70.63	29.37	23.67	33.13
	ED	78.8	57.1	21.7	72.46	27.54		
7	CA	141.1	101.4	39.7	71.86	28.14	24.70	34.51
	CB	134.0	95.5	38.5	71.27	28.73		
	EC	125.1	88.7	36.4	70.90	29.10	23.92	33.46
	ED	134.2	96.7	37.5	72.06	27.94		
8	CB	202.8	150.8	52.0	74.31	25.69	21.38	28.76
	ED	186.0	133.0	53.0	71.51	28.46	22.05	30.83
9	CB	163.2	117.5	45.7	72.00	28.00	24.48	34.00
	ED	206.8	152.3	54.5	73.65	26.35	23.89	32.45
10	CA	75.2	51.0	24.2	67.82	32.18	19.49	27.96
	CB	106.7	75.8	30.9	71.19	28.81		
	EC	118.0	80.8	37.2	68.47	31.53	22.56	32.53
	ED	83.6	59.0	24.6	70.57	29.43		
11	CA	156.2	112.0	44.2	71.70	28.30	18.68	26.05
	EB	117.3	77.0	40.3	65.64	34.36	15.46	23.36

[1] C rats are control ones; E rats are "experimental," i.e. *castrated*, animals.

Again, the average surplus of calcium for the 4 cases in which the mineral

proportion in the ash from the teeth of the corresponding *castrated* rats (E), is

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1.99 per cent.; for the ash from the teeth of the 7 *castrated* groups (E), with average gross excess of calcium for E teeth over C teeth amounting to 0.33

TABLE 4.—DATA PERTAINING TO EFFECTS ON THE WEIGHTS OF THE VARIOUS ANALYTIC PORTIONS OF THE TEETH, FOR EACH SUB-GROUP OF RATS. (*See Table 3.*)

(The values recorded in this table represent the *average* weights of the rats in the sub-groups.)

Exp. No.	Rat sub-group.	Weights of tooth portions.			Balances: C > E signified by +; E > C signified by −; E = C signified by =		
		Dry. (Total solids.)	Ash.	Organic matter.	Dry. (Total solids.)	Ash.	Organic matter.
		mg.	mg.	mg.			
1	C[1]	242.6	182.1	40.5			
	E[1]	199.0	144.7	54.3			
	diff.	43.6	37.4	—13.8	+	+	−
2	C	168.7	119.1	49.6			
	E	185.1	94.2	40.9			
	diff.	33.6	24.9	8.7	+	+	+
3	C	113.9	78.2	35.7			
	E	139.6	98.8	40.8			
	diff.	—25.7	—20.6	—5.1	−	−	−
4	C	171.9	122.8	49.1			
	E	174.7	125.7	49.1			
	diff.	—2.8	—2.9	0.0	−	−	=
5	C	201.1	149.4	51.7			
	E	208.1	156.0	52.1			
	diff.	—7.0	—6.6	—0.4	−	−	−
6	C	83.5	58.8	24.8			
	E	86.9	62.1	24.8			
	diff.	—3.4	—3.3	0.0	−	−	=
7	C	137.6	98.5	39.1			
	E	129.7	92.7	37.0			
	diff.	7.9	5.8	2.1	+	+	+
8	C	202.8	150.8	52.0			
	E	186.0	133.0	53.0			
	diff.	16.8	17.8	—1.0	+	+	−
9	C	163.2	117.5	45.7			
	E	206.8	152.3	54.5			
	diff.	—43.6	—34.8	—8.8	−	−	−
10	C	91.0	63.4	27.6			
	E	100.8	69.9	30.9			
	diff.	—9.8	—6.5	—3.3	−	−	−
11	C	156.2	112.0	44.2			
	E	117.3	77.0	40.3			
	diff.	38.9	35.0	3.9	+	+	+

[1] C rats are "control" ones; E rats are "experimental," i.e. *castrated*, animals.

plus calcium differences, it is 1.65 per cent. For the 11 groups there is an average gross excess of calcium for E teeth over C teeth amounting to 0.33 per cent., or an average *surplus* of calcium to this slight extent in the mineral

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portion of the teeth of the *castrated* rats.

These general mathematical differences are too slight, however, to justify an inference that castration exerted constant or appreciable effects upon calcification in the teeth of the rats in these experiments.

That castration did not materially affect the general nutrition of the rats is clearly indicated by the figures in Table 2, where the data for "weight balances" show that, in 9 recorded cases, the E rats were *heavier* than the C rats at the ends of 6 tests, and that the E rats *gained* more than did the C rats in 5 of 8 experiments. The data in Table 2 show, with equal definiteness, that dental calcification was effected independently of influences on the body-weights of the rats.

That there were no material effects of castration on the dimensions and the curvature of the teeth was stated on page 132.

The data in Table 4 show that, in 5 cases of the 11, the weights of the *dry* "control" teeth (C) were greater than the corresponding weights for the castrated animals (E); that in 5 cases of the 11 the weights of the *organic* portion in the "control" teeth (C) were greater than the corresponding weights for the castrated rats (E); and that in 3 cases of the 11, the weights of the *ash* from the "control" teeth (C) were greater than the corresponding weights for the castrated rats (E). In 3 of the 11 cases the weight of each of these three portions of the "control" teeth was greater than the corresponding weight for a castrated rat. In 4 cases of the 11 these three weights were greater for the teeth of the castrated rats than for the teeth of the "control" ones.

A study of the relative positions of the plus and minus signs, in Table 4, indicates strongly, however, that there was no particular effect on the masses and general composition of the teeth.

TABLE 5.—DATA PERTAINING TO COMPARATIVE EFFECTS ON "CALCIUM BALANCES" IN THE COMPOSITION OF THE TEETH FOR EACH SUB-GROUP OF RATS. (*See Table 3.*)

Exp. No.	No. of rats in each sub-group.		Percentages of calcium in the teeth.							
			Dry teeth.				Ash.			
					Difference.				Difference.	
	C[1]	E[1]	C	E	C > E	E > C	C	E	C > E	E > C
1	1	1	24.55	24.67	. . .	0.12	32.70	33.24	. . .	0.54
2	1	2	23.92	23.84	0.08	. . .	33.88	34.18	. . .	0.30
3	2	2	25.04	23.92	1.12	. . .	36.47	33.80	2.67	. . .
4	1	2	22.94	24.08	. . .	1.14	32.11	33.47	. . .	1.36
5	1	1	23.79	24.56	. . .	0.77	32.02	32.77	. . .	0.75
6	2	2	22.11	23.67	. . .	1.56	31.16	33.13	. . .	1.97
7	2	2	24.70	23.92	0.78	. . .	34.51	33.46	1.05	. . .
8	1	1	21.38	22.05	. . .	0.67	28.76	30.83	. . .	2.07
9	1	1	24.48	23.89	0.59	. . .	34.00	32.45	1.55	. . .
10	2	2	19.49	22.56	. . .	3.07	27.96	32.53	. . .	4.57
11	1	1	18.68	15.46	3.22	. . .	26.05	23.36	2.69	. . .

[1] C rats are "control" rats; E rats are "experimental," i.e. *castrated*, animals.

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One of the surprises in these experiments was the fact that the control males did not breed with normal females that were purposely associated with them continuously during the later months of each experiment. The cause of this unproductiveness is difficult to understand, because other groups of rats, caged in our laboratory under similar conditions and on the same diet, bred repeatedly. It is possible that a seasonal influence accounts for this anomalous result. At all events, the prevailing lack of virility of the "control" rats suggests that there was a corresponding deficiency in *special* influences of the testicles on nutrition; it also indicates the possibility that castration failed to exert noticeable effects on dentition because there was no *particular* sexual influence on dentition to be affected in the rats used during the periods of these experiments. The senior author plans to repeat the experiments under conditions that will remove the doubt in this connection.

Another possible complication was the presence of "ear infection." (See page 115.) We believe, however, that this "infection" had no significant bearing on the results, since the "infection" seemed to be localized, in the main. This opinion is supported by facts pertaining to nutritive exceptions to the rule—groups 6 and 10. In these groups there was marked malnutrition, yet the dental calcium values, while low, are not significantly so; the disparity may be due to differences in age, instead of to general nutritive deficiency.

IV. General Conclusions.

Eleven experiments of extended duration (27–262 days) on white rats (32), bilaterally castrated at ages ranging from 16 to 33 days, failed to yield significant effects on the general appearance, dimensions, curvature, weights (total solids, organic matter, ash), or calcium content of the incisor teeth.

It is possible that deficiency of productiveness in the *control* males during the course of these experiments destroys the significance of these negative dental findings. The experiments will be repeated and extended to test this possibility.

(See ADDENDUM on page 143.)

V. Review of Related Literature.

1. A large amount of work has been done on effects of castration, both in male and in female animals, but very little of it bears directly or indirectly on the problem of internal secretion in its relation to dentition.

Zuntz(1) reported that castration, in women, caused decreases in respiratory metabolism in two of four cases. Damiano(2), working with dogs castrated at birth, also observed diminished bodily oxidation. He reported, also, decreased elimination of phosphorus, calcium, and magnesium.

Curatulo and Tarulli(3) claim that the ovaries normally produce an internal secretion which stimulates the oxidation of phosphorus, and that ovariectomy causes accumulation of calcium and magnesium phosphates. McCrudden(4) reported a case of osteomalacia in a woman, in whom castration caused retention of calcium and induced marked improvement in her condition. Reach(5) found, by analysis of the bodies of white mice, that castration had no effect on the calcium content in females, but diminished it in males. Saccone(6) found a temporary diminution of the urinary alkaline phosphates following castration in dogs. Schulz and Falk(7) found, by

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analysis of food, urine, and feces, that castration in dogs did not cause retention of phosphorus.

McCrudden(8), working with male and female dogs, obtained results which controverted the earlier view, generally held, that castration is followed by general metabolic retention of materials, especially of mineral substances. McCrudden found that there was a general tendency in the opposite direction after castration, and that removal of the sex glands did not cause decrease in the bodily oxidation processes. He objects to the conclusions of previous workers because, in most cases, the phosphates in the feces and food were not determined. McCrudden also concluded that osteomalacia is probably not a disease of the ovaries, as had previously been suggested.

Castration tends in both sexes, in general, to retard bone-development in the cartilaginous parts of the skeleton and to increase the size of the bones(9).

In the albino rat castration has no effect on the growth of males, but in females causes increase in weight, partly due to accumulation of fat and partly to general enlargement(10).

2. The interrelationships between the generative glands and the other internal secretory organs are exceedingly complex.

According to some workers, castration in dogs and man impairs the development of the *thyroids;* according to others it causes hypertrophy of the thyroid in dogs(11). Fenger(12) reports that castrated males have less thyroid tissue than normal males or females. The iodin content of the gland, per unit of body-weight, in castrated males, is midway between that of normal males and females.

Pellegrini(13) claims that there is a reciprocal inhibitive relation between the *pineal* and the sexual glands. In cats, castration causes atrophy of the pineal gland(14). On the other hand, castration of dogs, goats, oxen, swine, and cocks, is without effect in this connection.

Castration causes hypertrophy, or retarded atrophy, of the *thymus,* if performed on young animals(11 15 16 17). Almagia's(18) findings did not confirm this conclusion. He suggests that his divergent results were due to the difference between the stage of development of his own animals and those of earlier observers. Hewer(19) reports that sexual maturity, in rats, is delayed by feeding thymus. In females, given large doses of thymus, no histological changes were noted. In males, the testes were structurally affected; in the young, by retarded development; in the mature, by degeneration.

Schenck(20) reported that hypertrophy of the *adrenals* followed castration of female dogs. Removal of the adrenals caused growth and fatty infiltration in the interstitial cells in the unchanged follicular tissue of the ovary, but no change in Leydig's substance in the testicle(11).

Pituitary extract, and particularly the *pars anterior,* exerts markedly stimulative influence on the growth and development of the reproductive glands in both sexes, according to Goetsch and Cushing(21). Castration causes an enlargement of the hypophysis(11 22). This was not shown in rabbits and guinea-pigs(22) nor in eunuchs by X-ray procedure(11).

Marrassini(23) found that the *spleen* was hypertrophied in chickens after castration. This, he suggests, may be secondary to the enlargement of the hypophysis, and not a direct effect. He

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found([24]) no constant changes in the spleen, nor in the liver, kidneys, or adrenals, after castration, in rabbits and guinea-pigs of both sexes.

According to Rebaudi([25]) castration causes hypertrophy and increased function of the islands of Langerhans in the *pancreas*.

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Addendum.

In addition to presenting the substance of this section of the report for 1915–16, with the preceding section by Heft and Gies (see footnote, p. 131), the senior author referred incidentally, in his oral statement to the society, to various other portions of the work *in progress*, each of which will be described in a succeeding annual report. He referred, in this preliminary way, especially to experiments (*a*) on the effects of parathyroidectomy, (*b*) on the passage of substances through enamel, and (*c*) on "physiological variation" in the composition of the teeth of rats.

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Logical Asepsis in Dental Practice.

By J. R. CALLAHAN, D.D.S., Cincinnati, Ohio.

"THE public advocacy of advanced ideas demands endless reiteration. The repetition must be so continuous, if possible varied, and long-maintained, that at last by the action of certain psychological sequences people begin to suppose that these ideas and arguments are their own, and that the advocate is a platitudinarian. It is only when, having long thought him mad, they think him dull, that he may congratulate himself on having done his work."(1)

I would be surprised if any member of this society should raise his voice in condemnation of the practice of logical asepsis in relation to any and every operation within the oral cavity; still I should meet with a surprise—no, two!—if 50 per cent. of those present do go through with a root-canal treatment and filling, maintaining a thorough asepsis, at the same time preserving the integrity of the surrounding vital tissues, with the methods and appliances now in use in the majority of offices.

I am not trying to hold my profession up to ridicule, for the dentist is as conscientious, capable, and thorough in his sterilization and general asepsis as other sections of medicine, excepting surgery; surgical practice stands upon asepsis as upon a rock, and it is for us to "observe, reflect, and record."

I do not call to mind a single operation in daily practice that does not call for surgical cleanliness. At the same time I remember the scores of offices that I have visited; and when I examine the various office appliances and equipments that are placed on exhibition by dental supply dealers—and above all, when I remove the veil from my own eyes, or have it removed through the experience and observations of two years' service in and about the surgical pavilion of a large hospital, and study my own office and practice—I have to admit that we have not kept pace with the growth and development of aseptic surgery.

S. Mark White, M.D., University of Minnesota, in a paper read during the Panama-Pacific Congress in San Francisco, said: "For the most part dental asepsis has not yet reached the perfection of the surgical operating rooms; it becomes apparent that the methods used are such as to invite rather than prevent infection. This is a question, however, for the dentist."

Again does another branch of the medical profession give us a truth that can-

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not be passed over lightly. Practically the same statement has been made over and over again by dentists, but do we as a profession make a whole-hearted effort to meet the situation? Suppose we examine our equipment and technique. With your consent let us analyze my own office and methods—for I myself have

stery on chair; on the floor will be noticed a rug (Fig. 1), and at the windows two heavy curtains.

BACTERIOLOGIC TESTS OF OFFICE CONDITIONS.

To test conditions, a culture-plate was placed on the cabinet and exposed for

FIG. 1.

come up through all the phases of dental practice since 1877, and I have had, and still have, many things to learn.

In my own operating room the varnished walls are washed down once every week; the furniture is kept comparatively clean and free from dust; the linoleum floor is mopped every morning; no upholten minutes, then sealed and placed in an incubator. After 24 hours in the incubator, a smear showed the presence of a surprisingly large number (Fig. 2) of staphylococci. A further study of this culture-plate shows the presence of other micro-organisms; but just now we are interested merely in the presence of the

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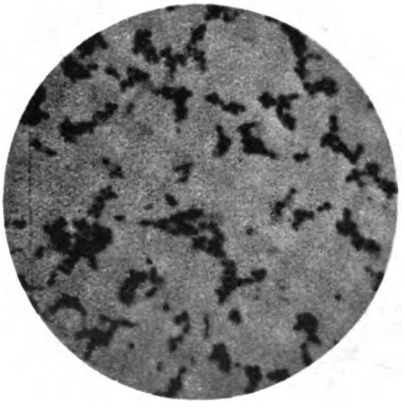
pathogenic germs, or micro-organisms that we know may become disease-producing.

What is wrong with these operating rooms from an aseptic standpoint? We come abruptly to the only point that we are now interested in: More dust gets into this room than should; the air of Cincinnati is dust-laden; there is the sweeping and moving about of the rugs, the shaking of the window curtains, the cleaning and dusting of the adjoining reception room (the books in the library

FIG. 2.



being wonderful dust-catchers). If the rugs and curtains are removed, I believe this operating room can be kept sufficiently clean and free from dust to make it a reasonably safe dental operating room; notwithstanding this belief, the room is to be enlarged and remodeled.

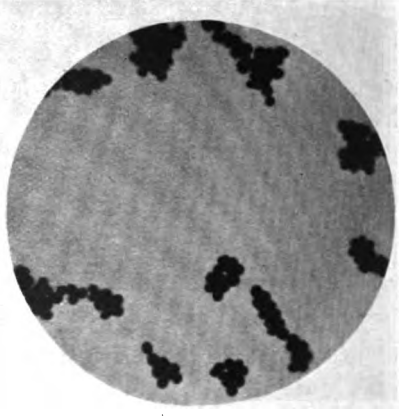
Aseptic surgery is an impossibility unless the hands of the operator are surgically clean. To make the skin absolutely free of micro-organisms by scrubbing is said to be an impossibility, therefore the surgeon makes use of thin rubber gloves. I think the time will come when the dentist will make more frequent use of gloves for his own protection as well as that of the patient.

FIG. 3.

The following experiment may be of interest at this point.

Just before washing the hands the finger-tips were placed in contact with

FIG. 4.



agar in a Petri dish; the slide shows, after 24 hours' incubation, staphylococci in abundance. (Fig. 3.) We will not stop to search for a stray streptococcus

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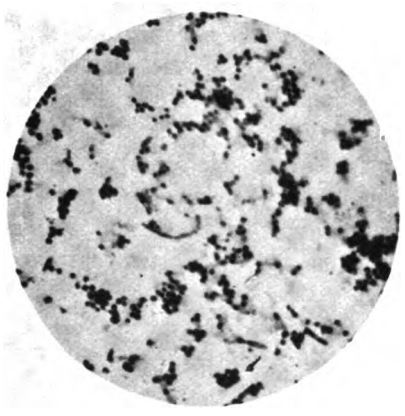
or pneumococcus or any other stranger that might be on the slide. Then the hands were scrubbed with soap and brush in running hot water; again finger-prints were made in agar, and a smear shows a few big fat staphylococci. (Fig. 4.) The large size indicates a low virulence according to some authorities. The hands were again thoroughly sterilized, and after working for a patient for fifteen minutes, finger-prints were made in agar; after 24 hours' incubation at 37½°

FIG. 5.



C. the smear showed a mixed culture of staphylococcus, colon bacillus, hay bacillus, etc. (Fig. 5.)

These simple and by no means thoroughly worked-out experiments show us that the rational thing to do is to get the hands clean and keep them clean, by thorough scrubbing for each patient, then rinse the hands at frequent intervals in some reliable non-irritating antiseptic —my choice being lysol or Dakin's fluid —or cover the hands with tincture of green soap, which soon dries leaving an invisible smear of soap over the hands that covers the sweat-glands, the hair follicles, and the epithelial scales, for a short time at least.

What appliances have we that should be sterilized, and how shall we sterilize them? Rubber dam is sterilized when in position on the teeth by washing the field of operation with alcohol (70 per cent.) or tincture of iodin. The chip-blower or hot-air pipe should be flamed; handpieces should be boiled in a green soap solution occasionally. For purposes of sterilization we may separate our instruments into two divisions:

First Division.

Clamps, Forceps, Broaches, Sprays, Hypodermic syringes, Mirrors, All cutting instruments, Pluggers.	These can be sterilized by boiling in water and soda in any receptacle that will hold water and stand sufficient heat; then dried on napkin.

Second Division.

Threads, Cotton pellets, Napkins, gauze, etc., Cotton on broaches, Absorbent paper points, Cotton shreds for packing in roots, Gutta-percha points, Pads, cottonoid, etc.	These should be sterilized in flowing steam and dried in hot air.

If it be true that the grade of service a dentist renders can be judged by the instruments or appliances he uses for a given purpose, then the sterilizers for instruments and materials that are used in daily practice in most of the dental offices of this country indicate a low grade of service, so far as asepsis goes. We are not referring to any other feature of practice, simply to *asepsis* in all that the word means to any and every branch of surgery.

When the manufacturers realized that there was to be a demand for sterilizers, they began to put on the market steril-

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izers that would sell—not apparatus that would meet the requirements; and the majority of dentists permitted talkative salesmen to deceive them in a manner that would be amusing if it were not so serious. As a result, wall cabinets appeared in many offices, the glass doors of which bear the legend, in large gilt letters, STERILIZER. So loud and so positive is the statement that one is deeply impressed. How could a micro-organism dare remain in an office with such a menace staring him in the face! An examination of the interior of the cabinet, however, puts a microbe at ease. While the cabinet is new, a little formalin in some form is kept in the cabinet. Dependence is placed upon formaldehyd—which, as everybody knows, is a germicide of the first class, but it is a difficult matter to confine gas; it leaks out while the case is closed, and when the doors are open it *flies* out. If instruments are boiled, then dried on sterile towels before being placed in the gilt-lettered cabinet; if the gilt-lettered door is gas-tight, and there be formaldehyd in sufficient quantity within the gilded case, then the instruments will remain sterile so long as the gilt letters and the gas hold out.

CHARACTER AND DEGREE OF HEAT NECESSARY FOR STERILIZING INSTRUMENTS.

It should be remembered in this connection that "Formaldehyd is an effective germicide only in the presence of moisture. Room or chamber humidity should not be lower than 60 per cent., temperature not less than 16° C. Dry heat is much less effective as a germicide than steam. In a dry atmosphere temperature ranging from 140° C. to 180° C. must be employed to insure sterilization. If steam under pressure be used, as in the autoclave, exposure for fifteen minutes to a temperature of 125° C. is sufficient to kill all known microbes. The difference between moist and dry heat doubtless depends upon the fact that the chemical or physical changes that cause coagulation of protein or the death of protoplasm take place, like such actions generally, more readily in the presence of water."(2) With regard to the staphylococcus aureus, Goadby ("Mycology of the Mouth") says the thermal death-point of this organism is between 56° and 58° C. for ten minutes' exposure, when in a moist condition; when dry, however, a temperature of 90° to 100° C., acting for the same length of time, is required.

Is it rational to claim that every instrument in the operating room should be sterilized? I do not see how we can in any reasonable way avoid doing so. Our hands and our instruments are in contact with infected tissues every day. I am not forgetting the difference between invasion and infection.

Two or three cases will illustrate what I have in mind.

CASE I. I show this case (Fig. 6) because it represents such a small infected area. Miss W., a case of arthritis and general nervous breakdown. The tooth was extracted, and a culture taken from the socket under proper sterile conditions shows the presence of an abundance of streptococcus viridans. (Fig. 7.) What should be done with every instrument that was used? Should these instruments be placed in the case after an indifferent rubbing or washing?

CASE II. (See Fig. 8.) After the removal of the bridge and the impacted cuspid, streptococcus pyogenes, also S. longus, were found in abundance. (Fig.

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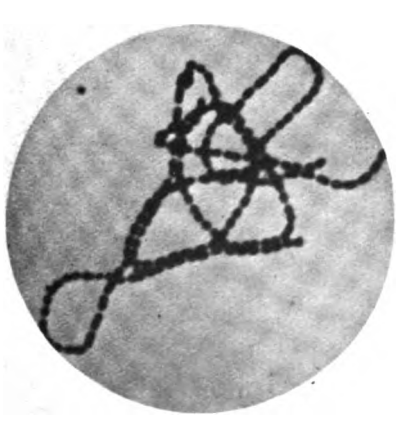
9.) Should these instruments be sterilized?

CASE III. (See Fig. 10.) A case of arthritis. This root has been filled with a dollar per bottle root-filling compound, warranted to prevent infection or reinfection in any root for a lifetime. A culture was taken from a broach that was in use while removing this popular and widely advertised root "stuffing" (Fig. 11), and shows the presence of almost every species of bacteria known to science. If any instrument used in this case, up to the time of filling the canal, should be laid on the cabinet or desk, the whole office would be liable to infection. What is the logical thing to do with these instruments?

FIG. 6.

FIG. 7.



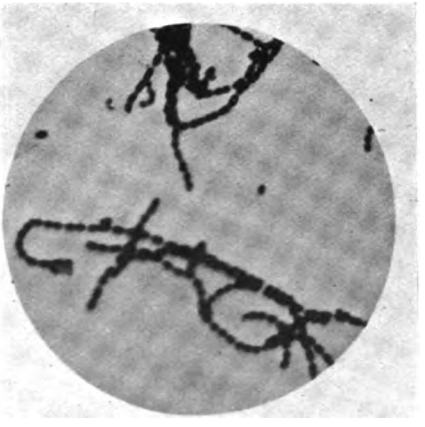
CLASSIFICATION OF INSTRUMENTS FOR STERILIZATION.

I have given above in the first division the list of instruments that could be sterilized in a most satisfactory manner by boiling in water. No sterilizer is really necessary for these other than a metal pan over a fire; some simply to be held in the alcohol flame. The second division, however, requires something different; they should be thoroughly sterilized and should come to the chair perfectly dry and cool, without having been touched or exposed to the chance of infection by being brought in contact with napkins taken from a dusty drawer.

Japanese paper canal points as they

FIG. 8.

FIG. 9.



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come to us in the sealed package are sterile, but the package has to be opened, and they are mussed to some extent before being used, some being kept for some time before being required for use.

FIG. 10.

A few of these points were passed quickly from the box to a Petri dish and then incubated. (Figs. 12 and 13.) These showed what are commonly called hay bacilli or B. subtilis; colon bacilli are also plainly seen in the center. The

FIG. 12.

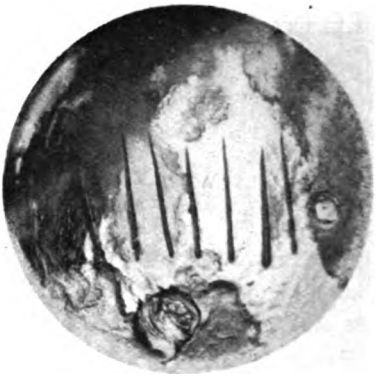
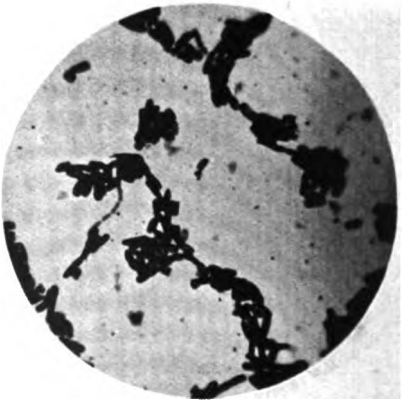


FIG. 11.

FIG. 13.



logical thing to do is to sterilize every point just before using.

This picture (Fig. 14) illustrates the most asinine habit that any group of specialists ever permitted themselves to become wedded to, namely, the twisting of cotton on broaches with the bare fingers, then thrusting that infected cotton into a deep canal from which they are trying to remove every trace of infected, or liable to be infected, material. If the cotton is saturated with a powerful germicide and you want a powerful germicide in the canal, all well and good; but suppose a mild antiseptic is being used—or, more to the point, suppose the cotton is being used to absorb blood or moisture—would it not be far more log-

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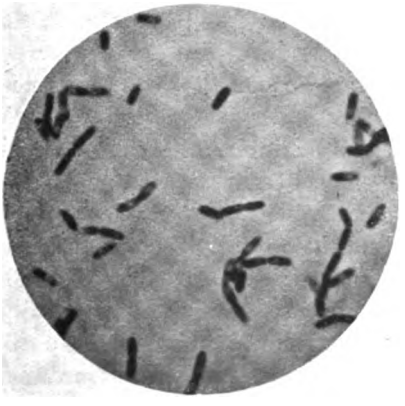
ical to sterilize the cotton, without using drugs with it, *after twisting* the cotton on the broach?

FIG. 14.

Fig. 14 shows cotton twisted with clean hands on sterile wood points (steel broaches rust in incubators), then placed on agar media in a Petri dish, and after

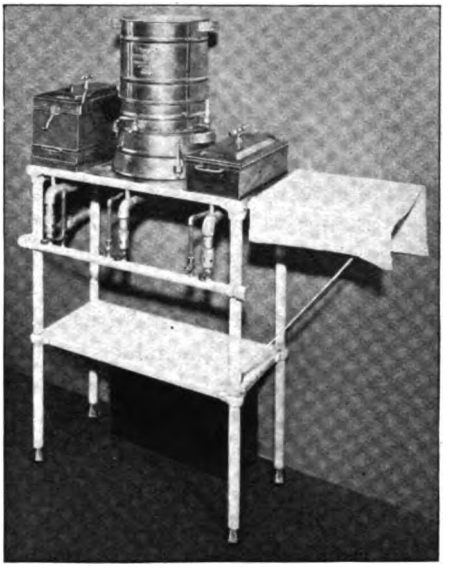
FIG. 15.



24 hours' incubation produced a growth of hay bacillus and colon bacillus in streptococcus form. (Fig. 15.)

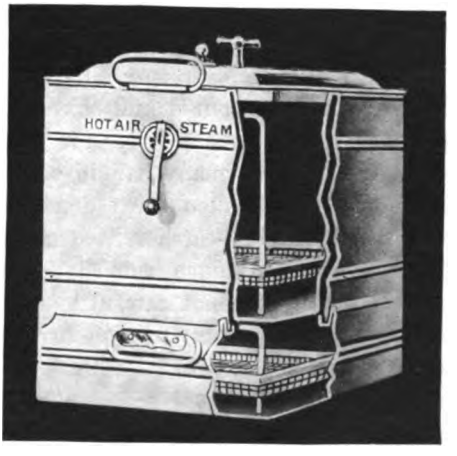
We have seen that there are several ways in which to sterilize the various instruments, but the one best method for

FIG. 16.



sterilizing any and all dental appliances is flowing steam, combined with hot air

FIG. 17.



for drying. The steel instruments, the paper points, the gutta-percha points, the napkins, everything to be sterilized, can

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be taken care of in the best and most thorough manner known, all at one time, in the same sterilizer.

Fig. 16 shows two sterilizers, and a still for distilling water. The small sterilizer is simply a boiler that is used for steel instruments. We do not really need the boiler, because the steam-chest or the Rochester combination sterilizer does everything, and does it better than any appliance that has come to my notice. Having worn out three electrical heaters, I am prepared to say that a gas heater is much more satisfactory, especially if you have a pilot light as shown in the illustration. The pilot is lighted the first thing in the morning, is always ready, and keeps the water warm. By turning on the gas in the main burner, steam is produced in a very few minutes. The plan of the boiler is shown in Fig. 17. The water being in the lower chamber, the steam passes up around and into the main chamber when desired. After having steamed the contents of the upper basket, a turn of the lever near the top allows the steam to pass out without entering the sterilizing chamber where the contents, gauze, cotton, etc., become dry in a few minutes. This outfit is only about half as large as it should be. The inside measurement is 7 x 14 inches. This sterilizer is to be found in all surgical and many dental supply houses, and as a rule they try to sell the smaller size, which I have found to be too small. If I can prevail upon you to avoid the impossible little toy sterilizers so popular today, logical asepsis in dental practice will have made a step forward.

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DISCUSSION.

Dr. A. R. Cooke, Syracuse. It is undoubtedly true that our dental offices, as offices, are poorly arranged for the purpose. We have too many hangings, too many oriental rugs, too many domestic rugs, too many dust-catchers, too many dirty corners, too much rubbish lying around, and we are not careful enough in other ways. The only way of correcting my own errors would be to throw all the equipment I have in the scrap-heap, rent a new office, and begin at the foundation, for I want an office that can be cleaned. I want an office which I am not dependent upon the janitor of the block to come in and clean for me.

We have gone at the question of sterilization in a very haphazard way. We have been buying a lot of nice expensive white-enamel furniture, and putting that up to catch the eye, to please the public, and lead them to think that we are being aseptic in our operations. Now, we are not aseptic in any sense of the word. I know I am not, and cannot be until I have a different office. There are many things we cannot do in our offices which the essayist has shown us ought to be done.

The matter of the sterilization of every instrument used for a patient before it is used for another case is abso-

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lutely essential, and can be practiced by anyone. Better care of the hands and of the materials we use is necessary. The essayist has shown that the ordinary paper points, while they may be sterile when made, are not sterile when we get them. We may sterilize our instruments in the sterilizer, and believe that they are sterile when they are taken from the apparatus. We bring them into the operating-room, put them in a case, the dust settles on them, and we no longer have sterile instruments. We may or we may not have pathogenic germs; we probably have many inoffensive ones.

I had hoped the essayist would tell us how to efficiently and properly sterilize such instruments as handpieces, which cannot be taken apart, in which the mechanism necessitates having a quantity of oil, and which we would like to have as clean as anything else.

In the matter of the care of the hands, I shall have to go home and get Dakin's solution, new brushes, new soap, and spend a great deal more time in scraping off these prehensile attachments of mine. I shall endeavor to find out what particular class of bacteria I carry around on my right thumb and index finger. We know what Dr. Callahan's brand is—he has told us.

While it is not possible for us to do all we ought, we certainly can do better than we have in the past, and if we are to get the results desired and are going to be safe and sane in regard to our patients, we must pay more attention to these things. I venture to say there are hundreds of offices in the State of New York which have absolutely no means of sterilizing instruments, not even an old rusty pan, and yet we wonder why we have so much dirty dentistry. It is no wonder to me that we have periapical disturbances and many systemic effects.

I do not know how many infections my patients have carried home, but, fortunately for me, they cannot prove that they got them in my office.

Let us go home and reorganize; throw out the old rubbish and get some new sterilizers. Let us be more careful about our instruments, and be honest about it. If we do that, the law will hold us blameless.

I wish to thank Dr. Callahan for coming here and giving us this talk. I think it is particularly profitable at this time.

Dr. Charles F. Ash, New York. I feel sufficiently interested in this subject to want to take up a minute or two of your time, because of some points Dr. Callahan brought out, and because of some points Dr. Cooke brought out in the discussion. I think Dr. Cooke struck the keynote of the whole situation when he said, Be honest; that means, be honest with yourself and your patients. He struck another very good note when he said the thing to do is to go home and discard the old equipment and get a new one, and if necessary get a new office. I suppose not every dentist has enough ready money to discard everything and get all new equipment, but if it is possible to discard such of it as is not adequate, and put in some that is adequate, you will find that the money has been spent to good advantage. The lovely white enamel furniture has been catching the patient's eye, and possibly we have told the patients we had it because we did not want to cause infection—that it was sterile. We have been impressing upon people the fact that it is possible for them to get infections from such sources, and now the patients are going

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to catch the dentist. They are waking up to the possibility of infection in our offices, and will demand that sterilization and the antiseptic methods necessary to protect them shall be followed out, and it will not be simply that the furniture be painted white.

A word about hand-brushes. If you have not used it, I would recommend a solution of potassium bichromate for keeping the hand-brush antiseptic. After you have used the brush, it should be washed out, put in the sterilizer and boiled, and when it is taken out of the sterilizer it should be placed in a glass container filled with potassium bichromate. After the container is thoroughly cleaned and filled with boiled water taken from the sterilizer, then put in just enough bichromate to give the water a deep orange color. It is not necessary to measure the exact percentage, because a little more than is necessary does no harm. I prefer that to lysol. It is a good antiseptic, and is not harsh on the hands. It is a good deal cheaper, too, costing about ten cents for four ounces. It is very comfortable to use on the hands, and does not leave any disagreeable odor. Brushes kept in this solution will remain sterile until you are ready to use them. With regard to handpieces, we put our handpieces right in the autoclave and sterilize them.

As to flowing steam, the objection I have to that is that it takes longer to sterilize anything with flowing steam than it does when put in the autoclave and sterilized under pressure.

Dr. Cooke. Will your handpiece stand the heat of the autoclave?

Dr. Ash. Yes. We usually wipe off the handpiece with alcohol, wrap it in gauze and put it in the autoclave. We use for waste receivers the paper containers made by Johnson & Johnson. Paper points, gutta-percha points, cotton, small napkins to be used for various purposes, and all such things, are put in the autoclave and sterilized. All instruments are put into boiling water and sterilized.

When I am ready to do root-canal work, I announce the fact to my nurse, and proceed to sterilize my hands. The cover from the jar that contains the brushes is removed, we start the water running, and use the brushes with a mixture of green soap—we use the kind that is used in the hospitals; my nurse makes it gallons at a time, and we find it efficient and not expensive.

While I am scrubbing my hands with the brushes from the jar, green soap, and hot water, the nurse produces a package done up in an antiseptic towel, and lays it on the operating table. That towel is wrapped in an outside container, which is discarded when the aseptic towel is ready to be used. The instruments are taken from the sterilizer directly with a pair of aseptic forceps and placed on the towel.

The nurse has another package which contains the napkin that I dry my hands on, and also we have rubber gloves ready in case we want to use them throughout the operation. The rubber dam has already been applied, and we have gone through the usual sterilizing procedure that you are all familiar with.

Many times I have seen a man spoil his whole operation by going into a root and then putting that instrument with other instruments that are sterile. If you use an instrument in a root-canal once, and put it with other instruments, you spoil those instruments. I put

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everything into a tray, and everything that goes into that tray is sterile until it is used.

I know it is hard to get out of the old ruts, but it is our duty to our patients to do so.

Dr. F. W. Low, Buffalo. I understand, Dr. Callahan, that we have to be particular when we are doing root-canal work. Would you consider it necessary to take all those steps in view of the mishaps that occur in the dentist's office —I mean an ordinarily clean man—in doing work other than the treatment of root-canals?

Dr. Callahan. If I understand your question, I believe we should follow these aseptic precautions in everything we do. I will cite a case: A patient was sent into our ward in the hospital with an infected mouth, which had been infected in extracting a third molar. The patient was in a very serious condition. A suit was threatened. If it could be shown that that dentist was not in the habit of following these lines of asepsis, that would settle the case.

Dr. Low. One of your slides showed the presence of different varieties of organisms. If the bacteria were dead, so they would not make a culture, what then?

Dr. Callahan. The smear from which the picture was made was taken from a culture. We did not obtain a pure culture from this case on account of an error in the technical work. The case was then thrown into the discard.

Dr. Low. Did you ever get a culture on taking out a root-filling that you considered perfect, to see if there were any possibility of infection there, after it was made by the most perfect filling method you knew of?

Dr. Callahan. No; that would be a valuable test in several ways.

Dr. Low. If we do not do that, we have not proved anything, in my estimation.

Dr. Callahan. The question of sterilizing the handpiece was mentioned. The method Dr. Ash spoke of is of course very effective. If you add a little bit of green soap to the water, and boil that, you can sterilize the handpiece. In some cities they have endeavored to pass a law that the barber shops should be examined and given certificates to the effect that they are using aseptic methods in their work; and in two places I know of the dentists were included.

Dr. Ash brought out the point that every instrument that has been used on an infected area should not be used again; it should be dropped into a glass dish. If the instrument were lying on the table I should be sure to take it up again, but it is the duty of the nurse to get it out of the way after I have used it.

Dr. Louis Meisburger, Buffalo. Would you consider it safe to have on your operating stand an evaporating dish with water in it at 90° C., in which to put the instruments? If you put them in this for three minutes, would you consider it safe to use them again?

Dr. Callahan. I would rather do it the other way.

Dr. Meisburger. You must give us something practical. I am afraid you are getting a little too pessimistic, and if I had not listened to Dr. Ottolengui yesterday, I would lose all hope. We must do something to improve our technique, but we must give the average man something he can use, and not simply to listen to at dental meetings.

Dr. Callahan. I do not think I have

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advocated anything that is impossible. It is your habits that you are afraid of.

Dr. Low. Besides the root-canal, you said we should take the same precautions with other work. If my hands and instruments are absolutely sterile, and I have gone into a bicuspid to excavate the dentin, if I take out one chip of the dentin must I put that instrument into the sterilizer again, or would I contaminate the cavity?

Dr. Callahan. You might get a different infection, because there are different kinds of micro-organisms at various depths.

Dr. Low. It simply shows that the question is one of absolute impossibility.

Dr. Callahan. My idea is to create the habit of thorough asepsis as nearly as I can. A lot of the work which you take for granted, because I have gone into the detail here, does not mean that I have advocated any extreme. I have advised you to buy the cheapest sterilizer that is made, and I have advised you to do the things that are protective to your patient. It is astonishing how they notice those things. Nearly every man, woman, or child of the educated classes understands what asepsis is. I want to cultivate the habit. I have had to correct myself very often, and still do so. If I lay an instrument down, I am sure to take it up again, and I have to be watched. My nurse watches me very carefully.

Dr. F. A. Ballachy, Buffalo. When you have laid down a broach which comes out infected, will close proximity contaminate other instruments, or must they be in contact with the infected broach? You stated, I think, that the whole surrounding area could be contaminated. Will it be by the air, or by contact?

Dr. Callahan. It would be difficult to answer that question definitely. We have two glass dishes in the cabinet, one for things discarded, and one for the things to be sterilized. The nurse removes these dishes after each patient.

Dr. Ballachy. Could the instrument stay in the dish until the end of the operation without contaminating your other instruments three or four feet away?

Dr. Callahan. I think so. On the bottom of each dish is a little water to which a few drops of formalin has been added. Be as clean as you know how, and keep it up.

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The Technique of Making Dental Radiographs.

By LEUMAN M. WAUGH, D.D.S., New York, N. Y.

(One of the Clinics. For Report of the Clinic Committee see page 42.)

IT will be my endeavor in the few minutes we shall have together to make clear to you that it is entirely feasible for any practitioner to do his own radiodontia right in his operating room, without seriously disturbing the average standard dental equipment. All that is necessary for us to have is an electric outlet, and the X-ray machine.

There are in the exhibit room several radiodontic outfits, any one of which I believe will give satisfactory service, and the selection may be governed by individual taste. For demonstrating I shall use the type with which I am most familiar, simply as a matter of convenience. Therefore I ask you to accept anything that I shall say as applying to radiodontia and radiodontic equipment in general, and not to any particular make or type of apparatus. Simplicity both of apparatus and technique will be our principal consideration.

First, I desire that we have firmly fixed in our minds that a radiographic negative is nothing more than a shadow, of which a permanent record is made. The only similarity to a photograph is that the shadow is recorded in the same chemic substance; in no other respect are they similar.

The light and dark areas in a radiographic negative correspond to similar areas of varying density in the structure radiographed. The zones of the structure that are dense resist the passage of the X-rays, producing a relatively light area in the negative, and conversely, the zones of the structure that are not dense permit the passage of the X-rays, resulting in a relatively dark area in the negative. Therefore a radiographic negative can show no more than the variation in the density of the structure, or of opaque substances, such as wires, etc., placed in the structure. A radiograph does not enlarge or magnify.

The technique may, for convenience of description, be divided into four stages, which are, in the order of procedure—(1) Seating and position of patient. (2) Placing of the film and tube. (3) The exposure. (4) Development, fixing, washing, and drying. All these procedures, except placing the film and tube, can be done equally well, with a little instruction, by any average assistant. We shall now consider each stage in detail.

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(1) *Seating and position.* The most convenient chair for making a dental radiographic exposure is the one in which the dental operation is being performed. If the rubber dam be in place it need not be removed, although opaque substances, as clamps, matrix retainers, separators, etc., that would cast a shadow in the field to be examined must be taken out. The presence of the dam does not materially lengthen the period of exposure.

(2) *Placing the film and tube.* This is the most important step and can best be done by the operator who is giving the treatment, because of his intimate knowledge of conditions and requirements. This step will take the most time for demonstration, therefore I shall take it up last.

(3) *The exposure.* This should be of definite length; counting is not usually of sufficient accuracy. A stop-watch, or better still, a timing-switch is most advisable, as either leaves the attention free to be centered on the patient.

(4) *Development.* The fingers need not enter the developer. A clip is placed near the edge of the film, which is hung vertically. Most uniform and satisfactory results are obtained by placing the film in the developer for a definite uniform time, a good working basis being five minutes, although this will vary according to the kind, the strength, and the temperature of the developer, and, what is very important, will depend on the length of exposure. It is best to have an accurate length of exposure and a definite period of development. If the negative comes out too light it will indicate that the exposure was too short, and if too dense, that the exposure was too long. The error can be corrected in developing the second film in the wrapper a longer or shorter time. In the next case the period of exposure can be corrected, so that a negative of proper density can be made in the standard length of time of development. After having been in the developer the desired time, the film is rinsed in water and placed in so-called "hypo" solution for twenty minutes or more, after which it is washed in cool, running water, for forty-five minutes or more, then removed and hung up to dry. This will take from one to two hours, and may be much hastened by placing in the breeze from a fan. A dark-room is best. It need not have running water.. Any light-tight closet will do that is large enough for one person.

By making all factors definite and constant, any average assistant can do equally well all parts except the placing of tube and film, and no one can do this so well as the dentist treating the case, because of his knowledge of individual conditions and requirements.

[Dr. Waugh demonstrated the placing of the tube and film with the aid of a patient, using a simple film-holder with an indicator showing the proper angle for the X-rays.]

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The Effect of Mouth Infections upon the General Health.

By R. W. BUNTING, D.D.S., Ann Arbor, Mich.

(One of the Clinics. For Report of the Clinic Committee, see page 42.)

IN the presentation of this subject I recognize that there are in the audience at least three classes of practitioners: First, those who have heard of the possibility of mouth infection being a menace to the body as a whole, but do not believe that it is true; second, those who believe it is true but have been so overwhelmed by the possibilities and responsibilities of dental practice in the light of present knowledge that they are uncertain as to the proper procedure in practice; and third, those who have become over-enthusiastic and extreme in their attempt to meet the new situation. In the few minutes which I have to give to the subject I wish to address my remarks more especially to the second group, those conscientious and painstaking operators who are perplexed by the trend of dental literature and teaching regarding dental infections today.

Gentlemen, I shall ask you to turn back with me ten years in dental practice. You will remember that we were busily engaged repairing and replacing teeth as best we could by the then known methods. We little suspected that the work we were doing had any direct effect upon the general health of our patients. In a general way we knew that the proper function of the mouth in mastication was of benefit to the body as a whole, and some of us had a hazy idea that chronic abscesses and pus-laden pockets about pyorrhetic teeth might be injurious, but most of us gave very little thought to such possibilities. Little did we suspect that today we would be called to account for the things we did in dental practice, and be charged with the responsibility of many and sundry ailments in our patients in places far removed from the mouth.

It was in 1910 that the first real interest was raised in the significance of dental infection by the strong statements of Dr. Hunter, who said that it was the cause of septicemia and heart lesions. A few years later Rosenow found that many systemic conditions, such as affections of the nerves, heart, kidneys, muscles, joints, appendix, and gall-bladder, which had formerly been considered

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as disease entities, were the result of infection. These infections he found to be specific blood-borne streptococci, and these had an affinity for certain tissues when injected into animals, these tissues being in a large per cent. of cases the same as were affected in the original patient from which the culture was taken. He then sought to determine the avenue by which these infections entered the body, and their source. The portals of entry he found to be in injuries of various sorts, the natural openings of the body, and the sinuses. But of all of these the most common portals of entry proved to be through the tonsils, the nose and its accessory sinuses, and the mouth. In the mouth he found dental abscesses and pyorrhea, the prevailing organism of which was a streptococcus similar to that of certain lesions in the joints, muscles, etc., and these same organisms when injected in animals produced lesions similar to those of the patient from which they were taken.

These experimental studies of Rosenow have been corroborated by a mass of clinical evidence from such men as Billings, Mayo, Moorehead, Hartzell, Price, and others, who have shown that many such cases give evidence of marked improvement when the oral foci have been cleared up and the primary infection eradicated—all of which has seemingly established beyond question the possibility of oral and tonsillar infections as direct causes of various systemic diseases. Later work has demonstrated the wide distribution of such systemic affections, and revealed an appalling prevalence of oral infections which may be harmful to the general health.

The result has been a widespread concern on the part of the dental profession as a whole in the significance of these findings as regards the proper procedure in everyday practice. Many conscientious operators have been appalled by the evidence at hand, and have been made to lose confidence in the safety of the operations which they have been making. Because of the possibility of infection they fear to devitalize a tooth, they fear the filling of a root-canal, they fear the treatment of an abscess, they fear the crowning of a tooth or the placing of a bridge, the treatment of pyorrhea, and sundry other operations which have been a matter of daily routine for years. They have lost confidence in themselves and their work, and are now seeking to know just what is safe and sane in dentistry.

Such an unsettled and perplexed state of mind is unfortunate unless it leads to a definite course of action which shall be an improvement upon the old ways and clear up the dilemma which now exists. It is therefore worth while to take stock of the things which we really know, and upon them build a procedure which is safe and sane.

In the first place we must recognize the fact that much that has been written and said upon the subject has been tinged with an over-enthusiasm, with the result that frequently a greatly exaggerated view has been given. If the reports obtained in investigations of free clinics and charity hospitals in the great cities were truly indicative of the condition of the average practice, we might expect that in the past ten years of practice at least fifty per cent. of our patients would be confined to hospitals or would have passed to the great beyond as the result of the dentistry which we have done for them. On the contrary, we have reason to believe that the dental service rendered by hundreds of careful and con-

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scientious operators of the past has not resulted in the crop of direful and disastrous results which have been pictured. Not that we would minimize the significance or importance of dental infections, or the dangers of careless and slovenly dentistry, but we do not believe that any evidence has been shown which has discredited the work of the careful and painstaking operators who have given their best efforts to perfect their dental operations. Such men may have their failures, but their percentage of errors is far less than is depicted by the reports of indifferent and, we might say, criminal dentistry which have been presented as evidence of dental conditions as a whole.

PREVENTIVE DENTISTRY THE DENTIST'S SAFEGUARD.

Our duty as dentists lies in the prevention of infection entering the body through the tissues of the mouth. We find that many pathogenic organisms are common inhabitants of the oral fluids, but that they are kept from the circulation by the mucous membrane which lines the mouth. It is only by breaking down these barriers that infection may gain entrance to the mouth tissues, and thence to the circulation beneath. One vulnerable spot in the mucous membrane is to be found in the openings which are made in it by the eruption of the teeth, and which exist about each tooth as long as it remains in position. Normally, the soft tissues are held tightly about the teeth, but when by injury or irritation this relation is lost, access for infection to the deeper tissues is opened up. By progressive stages the process which we know as pyorrhea severs the attachment of the tooth and surrounding tissues, producing a sheltered pocket in which organisms may grow and gain access directly to the circulation.

The second most vulnerable point in the mouth is that of teeth which have been attacked by caries; this destroys the pulp, which becomes infected with disease-producing organisms. The infection, after producing a putrefaction of the pulp, may then pass through the apical end of the root, to infect and destroy the tissues in that region by the formation of an abscess.

As these are the two most common and almost sole methods by which dental infection may enter the blood to be a menace to the body as a whole, we are chiefly concerned in pyorrhetic involvement and in devitalized teeth.

THE X-RAY AS AN AID IN DIAGNOSIS.

For information regarding the progress of peridental infections we have resorted to the use of the radiogram, without which a trustworthy diagnosis cannot be made. But many are making the error of using radiograms as an ultimate means of diagnosis rather than as one of several factors, which it really is. The practice of diagnosing a case from the radiogram alone is untrustworthy and dangerous. Take, for instance, the appearance in the film of a slight rarefaction or minutely abnormal condition at the apex of the root of a tooth. With our present knowledge no one is able to say in all cases whether this is an active infection or a latent one, a scar of an old injury, or *necrotic tissue*. In such a case our procedure should be guided largely by the general health of the patient. If there be no systemic affection and no direct

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evidence that the tooth is a menace to the individual it may be placed under surveillance, and not molested until such evidence is seen. But in case the patient gives evidence of systemic lesions of an infective nature which might possibly originate in the tooth under question, every effort should be made to clear up this and all other suspected foci in the mouth, even to the extraction of all such teeth.

Sanity and good judgment must control our diagnosis, rather than radical measures and empiricism. When a patient is referred by the physician as suffering from focal infection, no man can say at once that this infection has its origin in the mouth. Though there may be many abscesses and pyorrhea pockets in evidence, these may all be walled-off by granulations, and the poisonous effects of the infection confined, while an infected tonsil or antrum may be the real focus of the invader. But in any such case it is our duty to completely clear up all dental infection, by treatment, root resection, or extraction if necessary, until we may truthfully say that no focus of infection exists in the mouth. Then, and not until then, have we done our duty. If the patient recovers from his general symptoms we may infer that we have found the cause, but if he does not, search must be made in all of the other avenues by which infection may enter.

EFFORTS TO STANDARDIZE THE OPERATION OF ROOT-CANAL FILLING.

In regard to the filling of root-canals, very commendable advancement has been made in the past few years. Such men as Rhein, Callahan, Best, and Coolidge are seeking to reduce that operation to an exact science, and their teachings should be mastered by every practitioner. When this has been done, no conscientious operator need hesitate to devitalize a fully formed tooth whenever it is necessary to the performance of good dentistry. Such procedure when carefully done is much to be preferred to the overloading of vital pulps with irritating crowns and large inlay restorations which will ultimately cause their degeneration or death.

In pyorrhetic infections it is agreed that the deep and inclosed varieties are the ones to be feared. These are open to two methods of treatment other than extraction. By surgical planing and smoothing of the root the infection may usually be removed and the tissues caused to heal about the tooth, or the pocket may be eradicated by splitting the gum tissues with a lancet, thus baring the root to the point of healthy attachment. In either case the infective process must be stopped or the tooth removed.

Although some of us may feel that the pendulum of dental opinion is swinging too far in the enthusiasm over dental infection, it still remains that when this pendulum shall come to rest, it will be at a point removed from that at which it rested ten years ago. It will be over on the side of thoughtful and earnest consideration of dental operations in the light of the knowledge which has been gained. He who shuts his eyes to these possibilities and the evidence which has been offered is deceiving himself, and will soon be pointed out as a menace to his community. We must all perfect ourselves in dental diagnosis in regard to infections; we must learn to fill root-canals, and to treat pyorrhea. When we have done this, we may practice dentistry with joy in our hearts, and with the firm conviction that we are doing a real service to mankind.

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Practical Sterilization for the Dentist.

By LOUIS MEISBURGER, D.D.S., Buffalo, N. Y.

(One of the Clinics. For Report of the Clinic Committee see page 42.)

BY "sterilization" is meant the destruction or removal of all micro-organisms in or on a body or substance. Disinfection has a somewhat analogous signification, but denotes the destruction or removal of infectious microbes, and this may or may not be accomplished without complete sterilization, according to the nature of the particular case in hand.

Antisepsis means the inhibition of the growth of micro-organisms without necessarily killing or removing them, and is especially applied to the checking of microbic activity in wounds and the effects produced thereby (sepsis).

Food preservation involves similar principles, depending upon the prevention of microbic activity in dead organic matter either by sterilization or by the presence of inhibitive substances similiar to antiseptics, but in this instance called preservatives.

According to an article which appeared in a recent issue of the *Bulletin* of the U. S. Health Service the sterilization of dental instruments can be accomplished by immersion in phenol for from fifteen to forty-five minutes, 5 per cent. solution being more efficient than pure phenol. As we cannot stop to examine the instruments every fifteen minutes, the outside limit must be accepted.

The most expeditious and reliable method of sterilizing root-canal instruments is without doubt by heat. According to Hasseltine, author of the article above referred to, immersion for three minutes in boiling water or water at the temperature of 80° C. will kill all but the most resistant spores. Inasmuch as we are not especially concerned with spore-bearing bacteria, but more particularly with the staphylococcus and streptococcus, three minutes of boiling is all that is needed, and anything beyond that may be considered a margin of safety.

An evaporating dish or a similar vessel over a burner on the bracket table or near by enables the operator to use with safety the same broaches over and over again in the same operation. New broaches are not always sterile, because a broach once sterile does not necessarily remain so.

Instruments may be scrubbed with a stiff brush immersed in tincture of green soap and alcohol to remove débris, then

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placed as above in boiling water, or water at 80° C. Soap (green soap) has a slight germicidal value, which in conjunction with its solvent action on fats and protein and the mechanical cleansing which accompanies its use, justifies assigning it an important place among the chemical disinfectants.

In cases of specific infection, boiling instruments for fifteen minutes is recommended. Sodium bicarbonate or borax should be added to the water to prevent rusting. Calcium chlorid will prevent to a marked degree tarnishing or rusting of instruments, if placed in the cabinet in a glass container without top. It is highly deliquescent, and readily absorbs moisture from the air, and should be replenished every few days.

Steam at 250° F. will kill all spore-bearing germs. The standard method adopted in hospitals for the most refined surgical work is to boil instruments, entirely immersed in the water, for a period of fifteen minutes or longer, the instruments being thoroughly washed previous to sterilization.

We have here [indicating one of the sterilizers used in the clinic] a sterilizer with which we may sterilize all our instruments, including rubber dam, paper points, gauze, etc., with fifteen pounds steam, corresponding to 250° F., maintained for twenty minutes or longer. This is what hospitals are doing. There is practically no moisture, and the instruments are dry enough when taken out for immediate use.

As to proof of sterility: Dr. A. W. Diack of Detroit, a chemist, uses a tiny closed capsule in which he places a pellet of some chemical composition, which when subjected to fifteen pounds of steam pressure for a few minutes will melt. This pellet is useful in determining whether or not the operator is following instructions. If the pellet has not melted the process has not been carried out in accordance with instructions.

Gutta-percha cones should be immersed in alcohol. The fingers should be dipped in alcohol or Hogue's preparation of campho-phénique when placing cotton on canal-dressing instruments.

The hypodermic syringe should be kept in a solution of alcohol 2 parts, glycerin 1 part, and the needles placed in a container of alcohol and glycerin as above. Forceps, etc., should be dipped in alcohol and held over the flame before using, as well as having been sterilized. When gauze is sterilized do not have it rolled too tightly.

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Oral Anesthesia.

By HAROLD S. VAUGHAN, M.D., D.D.S., New York, N. Y.

(One of the Clinics. For Report of the Clinic Committee see page 42.)

IN considering briefly the advantages of local anesthesia we must not conclude that it entirely takes the place of general anesthesia, but it does fill a very large gap in oral surgery and exodontia between the cases where ether anesthesia and where nitrous oxid-oxygen anesthesia are indicated.

In the removal of impacted teeth where a moderate amount of bone excision is necessary conductive anesthesia with novocain-suprarenin is the method of choice. The operator can proceed carefully but surely, and as a result a clean, non-mutilated wound is left, in which healing is more rapid and after-pain lessened.

For the surgery of infected foci, granulomata, small cysts, fibrous growths, and root-end resections as done in the office, local anesthesia is essential for careful work.

In exodontia for hypercementosed roots, and roots that have been broken off below the alveolar border, by the careful use of elevators and chisel gouges under local anesthesia these operations can be performed with the minimum amount of surgical trauma.

Local anesthesia is also indicated in the extraction of teeth with divergent and curved roots where great care is necessary to prevent fracture or damage to the surrounding tissue.

Local anesthesia is indicated in general dentistry for cavity preparation in the type of patient whose dread of dental pain makes thorough work almost impossible. Conductive and infiltration anesthesia has made this work easier for both patient and operator, as well as in pulpitis where pressure anesthesia is contra-indicated. In crown and bridge work, local anesthesia makes possible the proper preparation for crowns and inlay abutments, or makes pulp extirpation easy where it is indicated.

Conductive and infiltration anesthesia also has its advantages and indications in patients with heart and kidney lesions who cannot take a general anesthestic, also where nitrous oxid is contra-indicated, in arterio-sclerosis with high blood pressure.

We divide local anesthesia into conductive anesthesia, or nerve-blocking, in which the object is to infiltrate the anesthetic around a larger nerve at a point

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central to the operative field, and thus block the nerve of power to carry sensation therefrom; and infiltration anesthesia where the operative field is thoroughly infiltrated with the anesthetic solution, thus affecting directly the terminal nerve filaments.

TECHNIQUE FOR MANDIBULAR ANESTHESIA.

With the index finger of the left hand the anterior border of the ascending ramus is palpated, first locating the sharp external border, then the internal border, which serves as a guide for the insertion of the needle. The needle is inserted at a point about 1 cm. above the line of the last molar, the syringe being directed obliquely on a line with the first bicuspid of the opposite side. The needle is then carried in closely in contact with the internal surface of the ascending ramus to a depth of about 2 cm., and 2 cc. of a 1 per cent. novocain solution is injected, producing anesthesia to the median line by blocking the inferior dental nerve where it enters the inferior dental foramen.

TUBEROSITY ANESTHESIA.

With the index finger of the left hand palpate the malar process of the superior maxillary bone, and insert the needle opposite the second molar at the gingivolabial fold. The needle is carried upward, backward, and inward to a depth of 2 cm. in contact with the zygomatic surface of the maxilla, about 2 cc. of the solution being necessary for an injection. The nerves supplying the molars and bicuspids are thus blocked off.

Infra-orbital anesthesia is used to block off the incisors and canine. With the index finger of the left hand the cheek is retracted, exposing the canine fossa. With the thumb the inner third of the margin of the orbit is palpated, the needle is inserted in the canine fossa and is directed upward to the region of the infra-orbital foramen, to which it is guided by the thumb, and about 1.5 cc. of the solution injected.

INFILTRATION ANESTHESIA.

In producing infiltration anesthesia around the teeth the needle is inserted about 0.5 cm. beyond the gingival border. The opening of the needle should face the bone, the solution being deposited under the periosteum. Injection should be made both labially and lingually.

CONTRA-INDICATIONS FOR LOCAL ANESTHESIA.

Local anesthesia is contra-indicated in cases of cellulitis, acute purulent osteitis and periosteitis, and in excited, hysterical, and neurasthenic patients where the thought of consciousness during operation produces psychic shock. Conductive and infiltration anesthesia is not indicated in more than a fair percentage of cavity preparations. It should not take the place entirely of sharp, well-cutting instruments and of judgment and care in the selection of the least sensitive portions of the cavity for retention.

It is understood that the field of injection and instruments should be sterile, and the solution non-irritating. Tissues should not be unduly distended or stripped from the bone. Even under a careful technique the injection of foreign material into the tissues may give rise to considerable after-pain.

A mandibular injection may at times give rise to considerable after-pain and soreness, difficulty in swallowing, trismus, or fixation of the internal pterygoid muscle. For these reasons it should not be employed indiscriminately or carelessly.

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Knox, H. E., San Francisco, Cal.
Marshall, J. S., San Francisco, Cal.
Merritt, Chas., New York.
Nash, S. M., New York.
Seabury, F. N., Providence, R. I.
*Shepard, L. D., Boston, Mass.
Stowell, S. S., Pittsfield, Mass.

* Deceased.

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Presidents of the New York State Dental Society.

Annual Session.	Name.	Residence.	Date of Election.
Organization	Amos Westcott	Syracuse	June 30, 1868
1st	B. T. Whitney	Buffalo	July 28, 1869
2d	L. W. Rogers	Utica	June 30, 1870
3d	W. B. Hurd	Brooklyn	June 29, 1871
4th	C. A. Marvin	Brooklyn	June 27, 1872
5th	J. G. Ambler	New York	June 26, 1873
6th	W. C. Barrett	Warsaw	June 25, 1874
7th	W. C. Barrett	Warsaw	July 1, 1875
8th	C. A. Marvin	Brooklyn	July 13, 1876
9th	L. F. Harvey	Buffalo	May 10, 1877
10th	A. M. Holmes	Morrisville	May 9, 1878
11th	C. E. Francis	New York	May 14, 1879
12th	O. E. Hill	Brooklyn	May 13, 1880
13th	O. E. Hill	Brooklyn	May 12, 1881
14th	L. S. Straw	Newburgh	May 9, 1882
15th	L. S. Straw	Newburgh	May 10, 1883
16th	L. S. Straw	Newburgh	May 14, 1884
17th	F. B. Darby	Elmira	May 15, 1885
18th	N. W. Kingsley	New York	May 13, 1886
19th	N. W. Kingsley	New York	May 11, 1887
20th	J. E. Line	Rochester	May 9, 1888
21st	E. D. Downs	Owego	May 7, 1889
22d	W. W. Walker	New York	May 14, 1890
23d	W. W. Walker	New York	May 13, 1891
24th	W. W. Walker	New York	May 12, 1892
25th	F. L. Van Woert	Brooklyn	May 10, 1893
26th	F. L. Van Woert	Brooklyn	May 10, 1894
27th	H. J. Burkhart	Batavia	May 9, 1895
28th	H. J. Burkhart	Batavia	May 14, 1896
29th	H. J. Burkhart	Batavia	May 13, 1897
30th	F. Le Grand Ames	Albany	May 12, 1898
31st	F. Le Grand Ames	Albany	May 11, 1899
32d	J. I. Hart	New York	May 9, 1900
33d	J. I. Hart	New York	May 10, 1901
34th	R. H. Hofheinz	Rochester	May 15, 1902
35th	R. H. Hofheinz	Rochester	May 14, 1903
36th	W. Jarvie	Brooklyn	May 13, 1904
37th	W. J. Turner	Brooklyn	May 12, 1905
38th	W. A. White	Phelps	May 11, 1906
39th	W. S. Rose	Schenectady	May 10, 1907
40th	L. Meisburger	Buffalo	May 8, 1908
41st	B. C. Nash	New York	May 9, 1909
42d	A. R. Cooke	Syracuse	May 10, 1910
43d	Ellison Hillyer	Brooklyn	May 5, 1911
44th	Charles F. Baylis	Oneonta	May 10, 1912
45th	Wm. W. Smith	Rochester	May 9, 1913
46th	Albert M. Wright	Troy	May 14, 1914
47th	Stephen Palmer	Poughkeepsie	May 13, 1915
48th	Robert Murray	Buffalo	May 12, 1916
49th	Amos C. Rich	Saratoga Springs	May 11, 1917

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CONTENTS.

	PAGE
Address of the President	66
Committees, list of	167
Dental Examiners	167
Essays and Discussions—	
"Removable Hygienic Bridge Work and Partial Dentures." By J. WRIGHT BEACH, D.D.S.	98
"Studies of Internal Secretions in Their Relation to the Development and Condition of the Teeth." By WM. J. GIES, PhD., Sc.D., and Collaborators. "No. 5" (for 1917), A Summary of Miscellaneous Findings, 107; "No. 3" (in full, for 1916), 112; "No. 4" (in full, for 1916)	131
"Logical Asepsis in Dental Practice." By J. R. CALLAHAN, D.D.S.	144
"The Technique of Making Dental Radiographs." [Clinic.] By LEUMAN M. WAUGH, D.D.S.	157
"The Effect of Mouth Infections upon the General Health." [Clinic.] By R. W. BUNTING, D.D.S.	159
"Practical Sterilization for the Dentist." [Clinic.] By LOUIS MEISBURGER, D.D.S.	163
"Oral Anesthesia." [Clinic.] By HAROLD S. VAUGHAN, M.D., D.D.S.	165
Executive Council, membership of	167
Fellows	170
Members, honorary	170
Officers, election of	18
" etc., for 1917–18	167
Presentation of Fellowship medal	10
Report—Committee on Arrangements	38
" Committee on Budget	39
" Committee on Clinics	42
" Committee on Ethics	37
" Committee on Fellowship	7, 35
Report—Committee on Finance (Auditing)	35
" Committee on General Business	39
" Committee on Law	26
" Committee on Legislation	36
" Committee on Liability Insurance	31
" Committee on Necrology	38
" Committee on Oral Hygiene	32
" Committee on Practice	91
" Committee on President's Address	31
" Committee on Registration	37
" Committee on Scientific Research, 104; Finance	30
" Committee on State Society Transactions	37
" Correspondent	75
" Delegates to N. D. A.	41
" Executive Council	15
" Secretary	19
" Treasurer	25
Reports from District Societies—	
First District	44
Second District	50
Third District	53
Fourth District	55
Fifth District	56
Sixth District	58
Seventh District	59
Eighth District	61
Ninth District	64
Sessions—First Day, Morning	3
" " Afternoon	7
Second Day, Morning	7
" " Afternoon	8
" " Evening	9
Third Day, Morning	14

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